Faculté des Sciences
Université Mohammed V de Rabat

UM5R
CEDoc - SCIENCES ET TECHNIQUES

EDITION
2023

Le Centre d´Etudes Doctorales
Sciences et Technique
organise
les Journées Doctoriales sous le thème :

Recherche scientifique : Levier du développement durable

15 - 20
MAI
2023

Institut Scientifique

Ecole Normale Supérieure

Ecole Supérieure de Technologie de Salé

Ecole Nationale Supérieure d'Arts et Métiers de Rabat

Preface

Dear colleagues, students and distinguished guests;

It is a great pleasure to welcome you, from May 15 to 20, 2023, to the Doctoral Days of the Center for Doctoral Studies in Science and Technology. This event, which brings together brilliant research minds, aims to celebrate the academic excellence, innovation and potential of doctoral students from our institutions.

Our Doctoral Days are an opportunity to share the results of our research, exchange ideas and stimulate new collaborations. As PhD students, you represent the next generation of researchers and scientists, and we are proud to support your academic journey.

This year, Doctoral Days are organized under the theme "Scientific research: a lever for sustainable development". The choice of this theme is based on the role played by scientific research as a lever for sustainable development; it provides the knowledge, tools and innovations needed to address the environmental, social and economic challenges facing our society.

Through detailed studies, experiments, and predictive models, researchers can identify the contributing factors to these problems and propose effective solutions. For example, scientists are working on new methods of clean energy production, waste management, sustainable agriculture, green transportation, prediction, information systems, artificial intelligence, health and many other areas.

The results of scientific studies thus provide objective data, enabling decision makers to develop evidence-based policies and to take appropriate actions.

By better understanding these issues, fostering innovation, informing public policy and raising public awareness, scientific research plays a crucial role in building a sustainable future. It is therefore essential to support scientists in their efforts to promote sustainable development.

In this context, the 2023 Doctoral Days are a platform to explore emerging fields of scientific research and to discuss the complex challenges facing our society. We strongly believe that your research and ideas will help shape a better future.

We are excited to hear about the innovative research projects and ideas that will be presented during the Doctoral Days. We hope that this event will foster intellectual exchange and inspire new collaborations among doctoral students, researchers, and scientists. We also encourage participants to take advantage of this opportunity to network with colleagues and experts in their respective fields.

The Doctoral Days will feature a variety of activities, including keynote speeches, presentations of research work and training workshops. We are also honored to welcome renowned researchers and professionals who have agreed to share their expertise and knowledge at this event. Their inspiring interventions will allow us to expand our horizons and push the limits of our knowledge.

We would like to express our deepest gratitude to the teachers, organizers, scientific and organizing committees, and all those who have contributed to making these Doctoral Days a reality. Their dedication and hard work have been essential to make this event a success. We hope that the Doctoral Days will be a success and leave a lasting impact on the academic and research communities.

Finally, we wish all the participants of the Doctoral Days of the Center for Doctoral Studies

in Science and Technology of the Faculty of Science of Rabat an inspiring experience, full of exciting scientific discoveries and fruitful exchanges. May you leave with lasting memories, strong academic ties and the confidence to continue your research career with commitment.

Thank you and happy Doctoral Days 2023 to all of you.

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المعهد العلمي
Institut Scientifique

Préface

Chers collègues, étudiants et invités distingués ;

C'est avec un grand plaisir que nous vous accueillons, du 15 au 20 mai 2023, aux Journées Doctoriales de la Faculté des Sciences de Rabat. Cet événement, qui rassemble de brillants esprits de la recherche, vise à célébrer l'excellence académique, l'innovation et le potentiel des doctorants de nos institutions.

Nos Journées Doctoriales sont une occasion unique pour partager les résultats de nos travaux de recherche, d'échanger nos idées et de stimuler de nouvelles collaborations. En tant que doctorants, vous représentez la prochaine génération de chercheurs et de scientifiques, et nous sommes fiers de soutenir votre cheminement académique.

Les journées Doctoriales de cette année sont organisées sous le thème "Recherche scientifique : levier du développement durable". Le choix de ce thème est fait sur la base du rôle que joue la recherche scientifique comme levier du développement durable ; Elle fournit les connaissances, les outils et les innovations nécessaires pour relever les défis environnementaux, sociaux et économiques auxquels notre société est confrontée.

La recherche scientifique aide à analyser les causes profondes de ces défis, tels que le changement climatique, l'épuisement des ressources naturelles et la pauvreté. Grâce à des études approfondies, à des expérimentations et à des modèles prédictifs, les chercheurs peuvent identifier les facteurs qui contribuent à ces problèmes et proposer des solutions efficaces.

Ainsi, les scientifiques travaillent sur de nouvelles méthodes de production d'énergie propre, de gestion des déchets, d'agriculture durable, de transport écologique, de la prédiction, de l'information des systèmes, de l'intelligence artificielle, de la santé et bien d'autres domaines.

Les résultats des études scientifiques fournissent ainsi des données objectives, ce qui permet aux décideurs d'élaborer des politiques fondées sur des preuves et de prendre des mesures appropriées.

En comprenant mieux ces problèmes, en favorisant l'innovation, en informant les politiques publiques et en sensibilisant le grand public, la recherche scientifique joue ainsi un rôle crucial dans la construction d'un avenir durable. Il est donc essentiel de soutenir les scientifiques dans leurs efforts pour promouvoir le développement durable.

Dans ce cadre, les journées doctoriales 2023 sont une plateforme pour explorer les domaines émergents de la recherche scientifique et pour discuter des défis complexes auxquels notre société est confrontée. Nous croyons fermement que vos recherches et vos idées contribueront à façonner un avenir meilleur.

Nous sommes également honorés d'accueillir des chercheurs et des professionnels de renommés et qui ont accepté de partager leur expertise et leurs connaissances lors de cet événement. Leurs interventions inspirantes nous permettront d'élargir nos horizons et de repousser les limites de nos connaissances.

Nous tenons à exprimer notre profonde gratitude envers les enseignants, organisateurs, comités scientifique et d'organisation, ainsi que tous ceux qui ont contribué à faire de ces Journées Doctoriales une réalité. Leur dévouement et leur travail acharné ont été essentiels pour faire de cet événement une réussite.

Enfin, Nous souhaitons à tous les participants des Journées Doctoriales du Centre d'Etudes Doctorales Sciences et Techniques de la Faculté des Sciences de Rabat une expérience en-

richissante, empreinte de découvertes scientifiques passionnantes et d'échanges fructueux. Puissiez-vous repartir avec des souvenirs durables, des liens académiques solides et la confiance nécessaire pour poursuivre votre parcours de recherche avec détermination.

Merci et agréables Journées Doctoriales 2023 à toutes et à tous.

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Contents

Thematic 1

High Energy Physics, Gravitation and Cosmology

1. A search for gravitons in light by light scattering at the LHC

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Light by light (LbyL) scattering, $\gamma\ \gamma \rightarrow \gamma\ \gamma$, is a quantum mechanical process that is forbidden in the classical theory of electrodynamics, however, this process is possible at high energies and albeit very rare, can be observed In different expansions of the Standard Model (SM), there are potential additional contributions that can affect the measurement of light by light (LbyL) scattering and make it a sensitive probe for new physics In theory, every particle coupling to photons could be produced by and decay into two photons One of the possible candidates is massive graviton The limits on the production of gravitons through LbyL fusion are presented

2. Black holes in AdS spaces

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We study the thermodynamic behavior of black holes in AdS spaces. Precisely, we first present certain thermodynamic phases and phase Transitions. Then, we highlight the optical aspect by investigating the deflection angle of light rays near to AdS black holes in four dimensions.

3. On optical behaviors of cosmological black holes

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Motivated by event horizon telescope (EHT) data, we study certain optical aspects of cosmological black holes. Concretely, we examine the shadow of black holes in Anti-de-Sitter space-times. In particular, we elaborate a concise analysis dealing with the black hole shadows in four dimensions. Exploiting the Hamilton-Jacobi formalism, we show that the shadow geometric deformations depend on the involved parameter space. Precisely, we find that the mass and the spin control the size and shape of the shadows, respectively. In four dimensions, we explore a possible optical transition by the help of new geometric configurations appearing in the study of superentropic black holes. Based on the EHT international collaboration data, we provide certain predictions associated with the involved black hole parameters.

4. Multi detector Core Collapse Supernova neutrino analyses

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Core collapse supernovae (CCSNe) provide crucial insights into the dynamics of our Universe Neutrino observations from SN1987A,markedthe beginning of neutrino astronomy Due to the rare occurrence of galactic supernovae, it is essential to combine neutrino rates from multiple experiments in real time to maximize the transmission of information to telescopes One of the main challenges is locating the supernova within minutes, which requires robust CCSN simulations to estimate the distance accurately This analysis proposes new observables that combine information from various neutrino detectors sensitive to different neutrino flavors to identify flavor conversion phenomena and correct distance estimates and then allow us to build a better understanding of neutrino flavor conversions across a wide range of supernova models and distances Finally, algorithms will be proposed to identify deviations from standard conversion scenarios and constrain neutrino properties

5. CALIBRATION OF SUPER KAMIOKANDE USING AN ELECTRON LINAC

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In order to calibrate the Super Kamiokande experiment for solar neutrino mea surements, a linear accelerator (LINAC) for electrons was installed at the detector LINAC data were taken at various positions in the detector volume, tracking the detector response in the variables relevant to solar neutrino analysis In particular, the absolute energy scale is now known with less than 1% uncertainty

6. Integrable Superspin Chains in String Theory

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Using results on topological line defects of 4D Chern Simons theory and the algebra/cycle homology correspondence in complex surfaces S with ADE singularities, we study the graded properties of the sl(m—n) superspin chain and its embedding in string theory Because of the Z2 grading of sl(m—n), we show that the (m + n)!/m!n! varieties of superspin chains with underlying super geometries have different cycle homologies We investigate the algebraic and homological features of these integrable quantum chains and give their brane realisation in type IIA string and its uplift to M theory

7. Le paradigme MOND : une solution simple aux courbes de rotation des galaxies

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Les observations astronomiques mettent en evidence une lacune substantielle dans notre comprehension de la physique, manifestee par une faible masse detectable pour rendre compte des mouvements observes dans divers systemes, compte tenu de notre connaissance actuelle de la gravite Parmi les problematiques inherentes a la gravite figure celle des courbes de rotation des galaxies

Une solution proposee a ce probleme est la theorie des dynamiques newtoniennes modifiees MOND Ce paradigme a ete propose comme une alternative a la matiere sombre pour expliquer le mouvement des etoiles et des galaxies Une solution proposee par cette theorie est que les lois de la gravite devraient etre modifiees a des echelles d acceleration faibles, a ces faibles accelerations, la force gravitationnelle entre les objets devient plus forte que ce que predisent les lois de Newton, ce qui explique le mouvement observe des objets astronomiques sans necessiter l existence de matiere sombre

8. Search for magnetic monopoles with the KM3NeT neutrino telescope

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Magnetic monopoles are hypothetical particles that can be detected by their direct Cherenkov emission or that of relativistic secondaries in transparent media Large scale neutrino observatories designed to detect Cherenkov emission of secondaries produced in high energy neutrino collisions provide sensitive probes of a cosmic flux of monopoles This particular signal has been studied by various neutrino observatories like IceCube, ANTARES, Baikal and AMANDA in the past This work shows a new analysis with KM3NeT Monte carlo simulation of magnetic monopoles taking into account the Kasama, Yang and Goldhaber model for their interaction cross section with matter This work focuses also on the project of the integration of digital optical modules, a task carried out in the faculty of Sciences in Rabat, and being a major step in the construction of the KM3NeT telescope

9. Holographic F(Q,T) gravity with Lambert solution

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In this work, we study a model of holographic dark energy using FLRW cosmology in the context of modified gravity An extension of the symmetric teleparallel gravity is obtained by considering the gravitational action L is given by an arbitrary function f of the non metricity Q and of the trace of the matter energy momentum tensor T so that L=f(Q,T), where Q is responsible for the gravitational interaction We govern the features of the derived cosmological model in view of the relation between cosmic time and redshift as t(z)=(kt(0))/f(z) where f(z)=W(b/k*e((b ln(1+z))/k) and W denotes the Lambert function, and discuss the evolution trajectories of the equation of state parameter and stability parameters in the evolving universe

10. Inflation cosmologie

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We investigate inflationary models in f(R, T) modified gravity with a kinetic coupling term Taking $f(R,T) = R + 2\beta T$, we calculate and analyse the relevant observable quantities including the spectral index ns and the tensor to scalar ratio r using the slow roll approximations Concretely, we consider two scenarios described by the decoupling and the coupling behaviors between the scalar potential and the $f(R,T)$ gravity via the moduli space by dealing with two potentials being the quartic one $V(\phi) = \lambda\phi^4$ and the small field inflation $V(\phi) = V0(1\phi/\mu)^a)$ For the quartic inflation model, we consider a decoupling behavior For the small field inflation, however, we present the parameter decoupling and coupling scenarios For both scenarios, we compute and inspect n_s and r showing interesting results

11. Search for Higgs boson decays to beyond the Standard Model light bosons in four lepton final states with the ATLAS detector at the LHC

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Astrophysical observations support the existence of Dark Matter (DM) in the universe Hidden sector states are proposed in extensions to the Standard Model (SM) to mediate DM interactions The LHC searches for a beyond the SM vector boson that couples to the SM particles through a Higgs boson ATLAS data is used to search for a new boson X with a mass between 1 60 GeV that mediates DM interactions through an intermediate state H ZX/XX 4l(l=e,), where H is a 125 GeV Higgs boson The analysis sets upper bounds on the branching ratios BR(H XX 4l) as a function of the dark boson mass with 95% confidence

level Results show no excess of events above the SM background predictions The study is discussed in detail, and the talk also covers the study of the ITk Strip staves for the Phase II LHC upgrade

Thematic 2

Quantum Physics and Applications

1. Quantum Fisher information and skew information correlations in dipolar spin system

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The quantum resource theory heavily relies on Quantum Fisher information (QFI) and Skew Information (SI), which are essential in applying state parameter estimation and quantum metrology within the physical system In this article, we investigate the nonlocal correlations of a pair of spin 1/2 particles, coupled with dipolar and Dzyaloshinsky Moriya (DM) interactions, acting as the physical carrier of quantum information Our study examines bipartite nonlocal correlations for the thermal equilibrium states of spin 1/2 particle systems, characterized by local quantum uncertainty (LQU) and local quantum Fisher information (lQFI) Moreover, we analyze the effects of dipolar coupling constants on quantum correlation quantifiers, revealing the significant enhancement of quantum correlation due to the DM interaction

2. ON THECOUPLING OF AUTONOMOUS QUANTUM REFRIGERATORS

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We study a model of two identical autonomous quantum refrigerators that interact through their qubits coupled to the cold thermal baths By coupling the two systems, we show that under certain conditions on the model parameters, the devices can operate in the regime of independent autonomous quantum refrigerator or be subject to an adjustment of the thermodynamic performances We further investigate the correlations induced by the interaction between the two refrigerators, and illustrate their behavior with respect to the thermodynamic performances We have found that adjusting the different interaction constants of the model can lead to an evolution of the quantum correlations of the two machines that is inversely related to the behavior of the thermodynamic quantities of both refrigerators However, this is not necessarily the case when the temperatures of the model are considered as the reference parameters

3. Estimating phase parameters of a three level system interacting with two classical monochromatic fields in simultaneous and individual metrological strategies

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Recently, the Hilbert Schmidt speed, as a special class of quantum statistical speed, has been reported to improve the interferometric

phase in single parameter quantum estimation Here, we test this concept in the multiparameter scenario where two laser phases are estimated in a theoretical model consisting of a three level atom interacting with two classical monochromatic fields we compare the performance of laser phase parameters estimation in individual and simultaneous metrological strategies, and we explore the role of quantum coherence in improving the efficiency of unknown multi phase shift estimation protocols

4. Quantum Otto engine using InAs quantum dots

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A quantum Otto engine is a quantum heat engine operating on quantum mechanical principles In this paper, InAs (Indium Arsenide) quantum dots are considered as a working substance, which allows the engine to operate at very small scales, in the presence of an electric field E, and the Forster mechanism, which describes the transfer of energy between quantum dots and affects the engine s behavior In this work, we study the behavior of the work performed by the engine and the level of entanglement in the system as the Forster parameter was varied We found that the work performed by the engine was affected by the Forster interaction and the electric field and that the entanglement in the system also changed as the Forster parameter was changed

5. Set Covering Problem With paraphrase Unmanned Aerial Vehicle Considering Fixed Radius Coverage Constraint

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This paper models the problem of providing an unmanned aerial vehicle (UAV) based wireless network in a disaster area as a set covering problem that takes into consideration the operational constraints and benefits of UAVs The research presents a branch and price algorithm and two approximation models of the quadratic coverage radius constraint in a simple discretization and a linear pairwise conflict constraint based on Jung's theorem

6. Thermal quantum correlation via skew information of a spin 1/2 Heisenberg trimer system

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In the present work, we carry out a description of multi qubit quantum correlations because of their distinguished physical prominence in quantum information processing and quantum communication To this end, we have studied quantum correlations within pure and mixed states of a tripartite quantum system which can be referred to as a spin 1/2 Heisenberg trimer with the exchange anisotropy and cyclic three spin interaction in the presence of the external magnetic field at zero as well as nonzero temperature Our study reveals that the non classical correlations quantified by means of local quantum uncertainty and the entanglement quantified in terms of negativity depend decisively on the intrinsic parameters as for instance the exchange anisotropy and cyclic three spin interaction parameters in addition to extrinsic parameters such as temperature and magnetic field

7. Support Vector Machines: A Powerful Tool for Classification Tasks

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Support Vector Machines (SVMs) are a widely used and powerful machine learning technique for classification tasks This paper provides an overview of SVMs, including their theoretical foundation, training meth-

ods, and practical considerations such as kernel functions and hyperparameter selection Applications of SVMs in various domains are discussed, along with limitations such as sensitivity to hyperparameters and lack of interpretability Current research directions and open problems are also highlighted, including the development of more efficient optimization algorithms and integration with deep learning Overall, SVMs are a versatile tool with significant potential for classification tasks in a variety of domains

8. evaluation neutronique de divers concepts de gainage tolerants aux accidents pour un potentiel de combustible annulaire a double refroidissement (Th 233U 235U)O2 pour les reacteurs avances a eau pressurisee

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Selon une etude precedente, l utilisation de combustible annulaire a double refroidissement (Th 233U 235U)O2dans l assemblage reacteurs avances de puissance a eau pressurisee 1000 (AP1000) a ameliore les parametres de securite par rapport aux combustibles solides et a double refroidissement UO2 Cette etude fait suite a des etudes anterieures dans lesquelles les performances neutroniques de gaines potentiellement tolerants aux accidents tels que l acier inoxydable austenitique de type 310 (310SS), le ferritique Fe 20Cr 5Al (FeCrAl), le ferritique metallurgique des poudres avance (APMT), carbure de silicium (SiC), Zircaloy 2/4, carbure de zirconium (ZrC), par rapport a la gaine ZIRLO TM seront etudies Nous utilisons le code neutronique DRAGON en conjonction avec la bibliotheque de donnees nucleaires ENDF/B VIII 0 pour analyser et evaluer le facteur de multiplication, la reactivite et le Burnup de decharge

9. On the effect of induced transition on quantum resources of two qubit DQDs

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Studying quantum properties in solid state systems is a significant avenue for research In this scenario, double quantum dots appear as a versatile platform for technological breakthroughs in quantum computation and nanotechnology This work inspects the thermal entanglement and quantum coherence in two coupled DODs, where the system is exposed to an external stimulus that induces an electronic transition within each subsystem The results show that the introduction of external stimulus induces a quantum level crossing that relies upon the Coulomb potential changing the degree of quantum entanglement and coherence of the system Thus, the quantum properties of the system can be tuned by changing the transition frequency, leading to the enhancement of its quantum properties

10. General Classification of Entanglement Using Machine Learning

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A classification of multipartite entanglement in qubit systems is introduced for pure and mixed states The classification is based on the robustness of the said entanglement against partial trace operation Then we use current machine learning and deep learning techniques to automatically classify a random state of two, three and four qubits without the need to compute the amount of the different types of entanglement in each run; rather this is done only in the learning process The technique shows high, near perfect, accuracy in the case of pure states As expected, this accuracy drops, more or less, when dealing with mixed states and when increasing the number of parties involved

11. Study of quantum correlation in Optomechanical cavities

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We quantify the stationary correlations between the optical mode and the relative mechanical mode of a ring cavity composed of a fixed mirror and two movable ones in a triangular design Using a ring cavity configuration not only enhances the optomechanical coupling by the displacement of the two movable mirrors, but also the circulation of the optical power inside the cavity enhances the intensity of the pumping power, not as in the case of a linear cavity The bipartite covariance matrix is used to evaluate the logarithmic negativity as a measure of entanglement, the Gaussian quantum discord as a measure of total quantum correlations, and the mutual information as a measure of the overall correlations The behavior of these quantities with respect to the environment's temperature as well as other parameters, such as the laser pumping power and mass of the movable mirrors, is discussed

12. Performance of an XXX Heisenberg model based quantum heat engine, and tripartite entanglement

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Utilizing the lower bound of concurrence, we investigate the tripartitethermal entanglementin an N qubit isotropic spin Heisenberg 1/2 XXX chain We demonstrate the relationship between the N sites in the chain, the temperature, the magnetic field, and the distance between each three qubits in the lattice Following the construction of a N qubit quantum heat engine based on this multiqubit Heisenberg spin 1/2 XXX model, the variation of various thermodynamic quantities (efficiency, work, and heat released and absorbed) is examined with respect to the tripartite thermal entanglement in zero and nonzero magnetic field, as well as for odd and even N chains The conditions that guarantee the constant preservation of the second law of thermodynamics are established

13. Enhancing the performance of coupled quantum Otto thermal machines without entanglement and quantum correlations

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In this work we show how we can enhance the efficiency of quantum Otto thermal machines without exploiting quantum entanglement or quantum correlations Furthermore, by analyzing the local and global extracted work we show that the difference between the two has nothing to do with quantum correlations as well

14. Informations de Fisher Quantique dans la teleportation Quantique

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La teleportation est le transfert d'un corps dans l'espace sans parcours physique des points intermediaires entre depart et arrivee La teleportation quantique est un protocole de communication (quantique) consistant a transferer l'etat quantique d'un systeme vers un autre systeme similaire et separe spatialement du premier en mettant a profit l'intrication quantique Contrairement a ce que le nom laisse entendre, il ne s'agit donc pas de transfert de matiere ni d'energie Le terme de teleportation quantique est utilise pour souligner le fait que le processus est destructif : a l'issue de la teleportation, le premier systeme ne sera plus dans le meme etat qu'initialement

15. Geometry of quantum states space and its appearance in quantum correlations

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With the development of geometric science, including methods of exploring the information world through modern geometry, there has always been a mysterious and fascinating ambiguous connection between geometric, topological, and dynamical features with quantum entanglement Because geometry studies the interrelationships between such things as distance and curvature, it provides information science with powerful structures that give practically useful and understandable descriptions of quantum integrable systems In this presentation, I will present the geometrical framework of quantum mechanics, exploring some geometrical aspects of quantum entanglement for the two qubit system and generally for an N qubit system and then an N qudit system

16. Controlled quantum teleportation between discrete and continuous physical systems

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Quantum teleportation of an unknown state basing on the interaction between discrete valued states and continuous valued states presented a particular challenge in quantum technologies Here we consider the problem of controlled quantum teleportation of an amplitude matched CV qubit, encoded by a coherent state of a varied phase as a superposition of the vacuum and single photon optical states among two distant partners Alice and Bob, with the consent of controller, Charlie To achieve this task, we use an hybrid tripartite entangled state (interaction between the discrete and continuous variables states) as the quantum resource where the coherent part belongs to Alice, while the single photon belongs to Bob and Charlie and the CV qubit is at the disposal of Alice

17. resolution de l equation de transport neutronique par la methode Pij moyennant le code APOLLO2 et la comparaison avec le code MCNP

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This article presents a very important study on the multiplication factor of infinite medium to control nuclear reactors Moreover , the study can allow us to know the capacity of the BWR PB nuclear reactors to operate for a reasonably long period without reloading or changing the fuel Furthermore, this study is carried out using the APOLLO2, MCNP calculation codes to know the influence of the Burn up, of the temperature on the multiplication coefficient in an infinite medium in the different cases of assemblies

18. Quantum metrology with superposition spin coherent states

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The quantum metrological performance of spin coherent states superposition is considered, and conditions for measurements with the Heisenberg limit (HL) precision are identified It is demonstrated that the choice of the parameter generating operator can lead to physically different estimation outcomes In particular, closed form analytical descriptions for the performance of spin cat states are derived These findings show the routes to careful control of parameters necessary for achieving HL precision and provide insightful information on the geometry of the specific coherent state superposition and its relevance to the performance of the states for parameter estimations

19. Quantum process tomography of the single shot entangling gate with superconducting qubits

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A single shot entangling gate plays a crucial role in quantum information processing due to its high fidelity This operation gate is fast to create a maximally entangled state and forms a universal gate set for quantum computing Here, we demonstrate by numerically simulating the use of quantum process tomography to fully characterize the performance of a single shot three qubit entangling gate This gate is used to create a Greenberger Horne Zeilinger (GHZ) entangled state in J Phys B 54, 175501(2021), directly generated by three transmon type superconducting qubits which are mediated by a resonator with the assistance of a microwave field Comparing ideal and simulated quantum process tomography, we characterize the entangling gate performance by calculating the mean fidelity achieving a high value 0:93

20. The Effect Of Inhomogeneity Of Seismic Faults On The Dynamics Of Earthquakes

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The Burridge Knopoff spring block model considers two smooth plates connected to blocks related by springs One of the plates that is in motion causes slip events when the speed of the blocks is greater than that of the plate However, in reality, the surface of seismic faults has complex structures Indeed, whatever its size, a soil element rarely has a continuous appearance Thus the friction phenomena will depend on the local structure of the surfaces in contact and consequently the threshold speed to trigger a slip event (an earthquake) will depend on the composition of these surfaces That is why, we introduce a new model of earthquakes who takes into account of the inhomogeneity of tectonic fault This is the Burridge Knopoff spring block model in one dimension with a stochastic force of friction The cluster size distributions of the earthquakes are found numerically to be consistent with the Gutenberg Richter law

Thematic 3

Materials Sciences: Corrosion

1. Use of different alcoholic extracts of TALF to inhibit corrosion of C38 steel in 1M HCl medium

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Corrosion is a natural phenomenon that occurs through the electrochemical reaction between metals and a corrosive environment To preserve metals, there are many successful methods used in corrosion protection, including the use of organic chemistry as inhibitors, and the use of organic matter compounds has been widely studied The use of organic corrosion inhibitors is considered the most reasonable method due to its high productivity, economic advantages, and wide applicability in various fields The aim of this study is the importance of using TALF and evaluating its efficacy as environmental inhibitors to prevent corrosion of C38 steel in 1 0 M HCl by electrochemical tests And analysis of the inhibitory ability of ethanol and methanol extract, and protection of C38 steel in 1M HCl from corrosion We say that our good results show us that we can use TALF with hot alcohol solvents as an excellent corrosion inhibitor for C38 steel in 1 M HCl medium

2. Exploratory Experiments Supported by Modeling Approaches for TGEEA New Epoxy Resin as a Contemporary Anti Corrosion Material for C38 Steel in 1 0 M HCl

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Abstract The evaluation of the anticorrosion of an epoxy resin, i e , Triglycidyl Ether Ethylamine (TGEEA) for C38 steel in 1 0 M HCl was explored Within electrochemical data, the TGEEA at a concentration of 5 mM is characterized by a high protection effectiveness reaching a 95 09% at 293 K the results of the potentiodynamic polarization showed that it s mixed type inhibitor, In addition, TGEEA exhibits high inhibitory efficiency over a wide temperature range between 293 and 323 K Regarding the morphological examination of the surface (SEM/EDX), it was demonstrated that the corrosion barrier is created by the TGEEA material adhering to the C38 steel/1 0 M HCl interface The theoretical approach (i e , Density Functional Theory (DFT), Molecular Dynamics (MD), and Monte Carlo (MC)) established an association between the TGEEA molecular structure and its anti corrosive capacity Theoretical investigations and experimental findings are well concordant

3. Etude de la corrosion abrasion des alliages inoxydables dans l industrie phosphoriques

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Resultats n'ont encore obtenu, en cours de realisation

4. Inhibition of corrosion of C38 in HCl medium by an alcoholic extract of the Boswellia Serrate plant from Yemen

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Corrosion is a natural phenomenon, which can be considered either chemical or electrochemical in nature, degrades the metallic properties of metal and alloys make them unfit for specific role Carbonsteel (C steel) plays a vital role in many types of machinery, engineering, construction and military fields, due to its excellent physical and mechanical properties This work is devoted to examine the corrosion inhibition ability of the alcoholic extract of a plant from Yemen for the corrosion of carbon steel in 1 M HCl by electrochemical techniques According to preliminary results of the electrochemical study, it appears that the addition of extract in medium (1M HCl) simulating steel causes the reduction of the corrosion rate The evolution of the diagrams of the effectiveness of the inhibitor with the concentration of the extract shows that the inhibitory efficiency increases with the increase of the concentration of the extract of the plant

5. Etude d'inhibition de la corrosion d acier doux en milieu HCl 1 M par le nouveau derive de quinoleine

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In this research, we evaluated the inhibitory performance of a new quinoline derivative (Q4) against mild steel (MS) corrosion in 1 M HCl using weight loss, potentiodynamic polarization (PDP), and electrochemical impedance spectroscopy The studied inhibitor showed high inhibition performance, as they achieved 88 4 % Q4 at 10 3M The PDP indicates that the derivative behaved as a mixed type inhibitor The Langmuir isothermal model is the most acceptable model to describe the adsorption of Q4 molecules on the MS surface Adsorption of the used inhibitor led to a reduction in the double layer capacitance and an increase in the polarization resistance Thermodynamic and activation parameters were discussed Quantum chemical calculations provided insights into the active sites and reactivity parameters governing quinoline derivative activity as a good corrosion inhibitor for mild steel

6. Electrochemical study on the anti-corrosive characteristics of benzothiazole derivative on carbone steel in 1M HCl acid solution

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The inhibitory effect of new benzothiazole derivative on the corrosion of carbone steel in 1 M HCl medium has been examined and characterized using electrochemical impedance spectroscopy (EIS), polarization curves plot (PDP) and SEM/EDX methods The obtained results indicate that this inhibitor has a good inhibitory and its inhibition efficiency reaches 98% at 10 3 M Electrochemical techniques results were in reasonable agreement The inhibitory effect increased with the concentration rise of this compound but decreased with the increase in temperature PDP technique suggested that this inhibitor acted as a mixed type inhibitor The adsorption process obeyed the Langmuir isotherm model Thermodynamic parameters and the scanning electron microscopy analysis were discussed for carbone steel in 1 M HCl medium and revealed the adsorption mechanism ofbenzothiazole derivative Surface topography analysis strongly confirmed the electrochemical findings

7. study of corrosion inhibitors of steel and coper by a organic compounds such as quinoxaline in an agressive environment

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The Quinoxalines compounds are a chemical substances using as a corrosion inhibitors, to reduce the corrosion rate of the metal To study this phenomena we use different technics such as Electrochemical Impedance Spectroscopic (EIS), Polorisation Potentiel (PP), Density Functional Theory (DFT) etc

8. Experimental study of the anticorrosive behavior of a derivative of hydroxyquinoline (Product 1) for carbon steel in 1M HCL

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In the present investigation, we evaluated the corrosion inhibition efficiency of a derivative of hydroxyquinoline for carbon steel in a 1 M hydrochloric acid environment by using potentiodynamic polarization and impedance spectroscopy (EIS) measurements The protection efficiency increases with increasing inhibitor concentration to attain 84 34% at 10 2 M in corrosive media Contrariwise, it decreases with increasing temperature The adsorption of hydroxyquinoline derivative onto the metal surface was in reliable with the isothermal model of the Langmuir adsorption Surface and protective film analysis have been carried out with scanning electron microscopy (SEM)

9. Valorisation of the essential oil against the corrosion of mild steel in hydrochloric acid medium 1M

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Corrosion is a problem that affects most industrial sectors and can cause huge losses In the case of industrial processes, metals are exposed to the action of acids used in petrochemical processes and during cleaning in several industries, these acids cause the degradation of metals Most synthetic anticorrosive compounds have a good anticorrosion action, but most of them are highly toxic to humans and the environment Due to these adverse effects, there is a growing focus on essential oils and plant extracts that are considered a source of green corrosion inhibitors In this work, we are interested in the study of the protection of mild steel in hydrochloric acid medium 1M by adding an essential oil The influence of concentration and temperature on corrosion processes in the absence and in the presence of the inhibitor has been studied by electrochemical study was performed using potentiodynamic polarization curves and electrochemical impedance spectroscopy

10. The effect of pH on the corrosion of Cobalt Chrom dental alloy

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The Cobalt Chrom dental alloy (Co Cr)utilised because of her high corrosion resistance and excellent mechanical properties has been studied as biomaterials for dental implant use However, the oral environment is an aggressive system, due to pH variation and different ions presence , that can decrease the metal alloy corrosion resistance This study aimed to evaluate the electrochemical properties of Cobalt chrom alloy (Co Cr) in artificial saliva solution in different pH, To imitate the oral environment, electrolytes with a pH equal to 2, 7, 9 and the pH of artificial saliva were used The Corrosion studies were performed by open circuit potential (OCP) observation, potentiodynamic polarization curve(Tafel) and electrochemical impedance (EIS) The corrosion resistance of Cobalt Chrom alloy (Co Cr) in different pH levels of artificial saliva depended on the sta-

bility of the passive layer It was found that an acidic pH level severely corrodes Cobalt Chrom metal alloy (Co Cr)

11. From Waste to Resource: Utilizing Green Tea Waste for Sustainable Development for various sectors

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Green tea is a by product of tea processing that contains various bioactive compounds such as polyphenols, flavonoids, and catechins This is why green tea waste has gained attention considering its potential in various applications This poster presents a comprehensive overview of the different components of green tea waste and their beneficial properties, as well as the various sectors where they can be used, including the agricultural filed such as a natural fertilizer due to its high nitrogen and potassium content Also, in the cosmetics field that can be used as an ingredient in skincare products by reason of its anti inflammatory and antioxidant properties In the food industry, green tea waste is presented as a natural food additive We can use it also in the production of natural dyes for textiles In the energy sector, we find green tea as a source of renewable energy through the process of anaerobic digestion The waste of green tea also plays a role in the medical sector

12. Effect of temperature on corrosion inhibition by ethanolic extract of Eriobotrya Japonica seeds in chloride medium 1M

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Corrosion is a serious issue impacting structures and is a major cause of industrial failure It proceeds as a result of the corrosive environment, which includes humidity, oxygen, inorganic and organic acids, high pressure, temperature, and metal composition and properties The inclusion of an inhibitor is required to slow down this process by introducing a chemical substance that stops the metal from oxidizing based on interactions with the metal s active sites and limiting the rate of corrosion For ecological reasons, the use of synthesized inhibitors is limited, and a waste recovery strategy is used, in which they are used as bio inhibitors rich in natural compounds created by less expensive procedures Organic waste extracts are a bio alternative for inhibitors since they contain inhibitory proteins, polysaccharides, and alkaloids Several aspects influence the efficiency of inhibition, including temperature, which has a substantial impact on the corrosion rate of materials

13. Clay based materials for solar energy

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Energy consumption along with environmental pollution and the growth of the world economy are the main problems facing today s society It is therefore necessary to develop clean and sustainable energies, such as solar, wind, etc The aim of this work is to shed light on clay based materials and how they can best be used in the energy field, transforming them from useful materials in cosmetics and adsorption to refined materials in energy technologies For this purpose, clay materials were processed and structurally characterized by SEM EDX and XRD analyses Scanning electron microscopy confirmed that the materials are homogeneous X ray diffraction patterns have clearly indicated that the system has a crystalline structure The purpose of this study was to transition to the use of the clay in other energy applications

14. Electrochemical analysis of combined effects of SF waste on the corrosion reinforced concrete

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This study aims to explain the combined effect of using waste SF on the structure of cement mortar to increase durability and evaluate the corrosion behavior of resulting reinforced concrete when interacting with these waste SF Open circuit potential (OCP) tests, electrochemical impedance spectroscopy (EIS), and the equivalent circuit model are applied to conform the measured electrochemical impedance data (Nyquist curve) and linear polarization resistance (LPR) with those established in the literature, by conducting them on samples immersed in a seawater solution of "HARHOURA" Scanning electron microscopy (SEM) imaging was also performed to characterize the surface porosity of the specimens This study aims to compare its results with those of existing studies in the literature to evaluate the accuracy of the method used

15. etude electrochimique d une nouvelle molecule a base de mercaptobenzimidazole contre la corrosion du Cu 30Ni dans une solution de NaCl a 3 %

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Le comportement electrochimique du Cu 30Ni dans une solution de NaCl a 3% a ete etudie avec et sans l ajout de bis Mercaptobenzimidazole (bis MBI) La surface de l alliage en l absence et en presence de bis MBI a ete evaluee en utilisant des inspections avec un analyseur de rayons X a dispersion d energie (EDX) et un microscope electronique a balayage (MEB) L analyse des courbes de polarisation a revele que le Bis MBI est un inhibiteur de type mixte en general, selon les resultats Les mesures d impedance electrochimique montrent que l efficacite de l inhibition augmente avec la concentration de la solution et le temps Les resultats ont montre que l efficacite d inhibition etait de 97,65% a 1 mM de l inhibiteur Le modele d adsorption de Langmuir predit que l inhibiteur se lie a la surface de l alliage Cu 30Ni D apres les donnees SEM/EDX, le processus d inhibition est provoque par une couche protectrice contre la corrosion

16. Etude comparative du comportement de l'alliage nickel aluminium bronze (NAB) en differentes milieux aqueuses

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Le bronze nickel aluminium (NAB), a joue un role cle dans l histoire humaine et il est largement utilise dans diverses d applications utilitaires, industrielles et dans d autres necessitant un materiau resistant a la corrosion et durable Ce travail comprend une etude comparative du comportement des alliages NAB dans l eau potable (EP) et l eau filtree (EF) La stabilite du film passif forme sur l alliage NAB a ete etudiee a l aide des techniques electrochimiques telles que la polarisation potentiodynamique et la spectroscopie d impedance electrochimique (EIS) La caracterisation du film passif a ete faite en utilisant la microscopie electronique a balayage (MEB), et la diffraction des rayons X (DRX) Les resultats ont indique que NAB a une meilleure resistance de polarisation (Rp) dans RF que dans EP La Rp en EF est de 112,40 Kohm cm; et Rp en EP est de 10,24 Kohm cm Ainsi, par rapport a la densite de courant, le icorr est de 0,5314 10 6 A/cm en EF et de 2,2311 10 6 A/cm en EP

17. Inhibition of corrosion of C38 steel in 1M H3PO4 medium by an esomeprazole drug waste

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In the present work, the corrosion inhibitory effect of Esomeprazole drug wasteon C38 steel in 1 0 M H3PO4 medium has been

studied The choice of this medical waste was made with the aim of recovering it for reuse in corrosion inhibition This effect of inhibition has been evaluated by Tafel polarization and electrochemical impedance spectroscopy The surface morphology has been characterized by scanning electron microscopy and energy dispersive X ray spectroscopy Tafel polarization analysis shows that EDW is a mixed inhibitor The results obtained by electrochemical impedance spectroscopy show that the inhibitory effect increases with increasing inhibitor concentration The results obtained from different testing techniques show that the use of Esomeprazole in a phosphoric acid medium can inhibit the corrosion of C38 steel up to 99 52% at a concentration of 10-4 M of Esomeprazole

18. The corrosion inhibition of mild steel in 1M HCl acid solution by DAB fish extract

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The corrosion inhibition of mild steel in 1M hydrochloric acid by DAB fish extract was studied using Tafel polarisation curves The effects of temperature on the corrosion behaviour of mild steel in 1M hydrochloric acid with the addition of the extract was studied The inhibition efficiency (IE) increased with increasing DAB extract concentration but decreased with increasing temperature The adsorption of extract on the metal surface follows the isothermal Langmuir model Polarisation studies show that the extract behaves as a mixed type inhibitor Scanning electron microscopy with energy dispersive spectroscopy (SEM EDS) confirmed that the corrosion inhibition of mild steel is achieved through the adsorption of extract molecules onto the metal surface

19. Corrosion inhibition of carbon steel in 1M HCl using new compound: Electrochemical adsorption and DFT studies

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Abstract Recently, many efforts have been widely made to develop techniques for corrosion problems The corrosion inhibitory action of new pyrazole derivative (PZ) on carbon steel in 1 M HCl was studied using potentiodynamic polarization technique, electrochemical impedance spectroscopy(EIS) measurements and quantum chemical calculation Scanning electron microscopy (SEM) and energy dispersive X ray spectroscopy (EDX) were used to analyze the surface morphology The effect of inhibitor concentration from 10 6 to 10 3 M was investigated in the temperature range 30 60; C Results showed that PZ was an efficient mixed type inhibitor The inhibition efficiency was found to increase with the increase in inhibitor concentration and decreases in temperature The adsorption of PZ on carbon steel obeyed Langmuir isotherm

20. Performance and efficiency of Carob seed vegetable oil (CSVO) as an eco friendly inhibitor for carbon steel in 1 0 M HCl

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In this study, the corrosion inhibition properties of carob seed vegetable oil (CSVO) for carbon steel in molar hydrochloric acidic media were evaluated The inhibition efficiency of (CSVO) was assessed using Potentiodynamic polarization (PDP) and electrochemical impedance spectroscopy (EIS) techniques Effect of inhibitor concentrations (200 1200 ppm), temperatures (293 323k), and immersion time (0 5 24 h) was investigated The optimum of 96% was obtained with 900 ppm of CSVO at 293K From the Nyquist plots enhancing (CSVO) concentration increases the charge transfer resistance, and decreases the double layer capacitance due to the adsorption of (CSVO) molecules on the CS surface Potentiodynamic polarization showed that (CSVO) behaves as mixed type inhibitor

21. Effet du mode de semis et des doses d'azote sur le rendement du ble dur (Triticum durum Desf) sous semis direct dans le site de Marchouch

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Une etude experimentale a ete menee sur le ble dur a la station experimentale de Marchouch de l'INRA L'etude s'est interessee au suivi des effets du mode de travail du sol (SC : travail conventionnel ; SD : semis direct), trois doses d'azote (20, 40 et 60 kg /ha) en utilisant trois varietes et deux germoplasmes du ble dur Dans l'objectif d'evaluer l'effet de ces facteurs et leurs interactions sur le rendement En conclusion, les varietes de ble Nachit et Faraj ont donne les meilleurs resultats dans des conditions de semis direct avec la dose minimale d azote Cependant, les valeurs de rendement en grain ont ete reduites, en raison du stress hydrique, qui a reduit l efficience de l utilisation de l azote

22. Evaluation of corrosion inhibition properties against mild steel in an acidic environment using new synthesized organic molecule

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Acid solutions are frequently employed in industries and many processes Nonetheless, their abrasiveness causes corrosion Most of the time, this occurrence is damaging and results in costly investments for restoring and maintaining industrial units, the majority of which are made of mild steel, particularly in the oil and gas industries [1-2] Corrosion inhibitors added to acid solutions appear to be the best choice for reducing acid attack, and then several types of chemicals have been discovered and employed for years [3] The use of organic inhibitors is a primary corrosion prevention approach, and it is regarded as the first line of defense against corrosion In this work, we will show the effect of these molecules to reduce corrosion rate, and their inhibition efficiency as a function of concentration [5,6] The use of green corrosion inhibitors became an appealing option This study involves the application of a novel molecule as a steel corrosion inhibitor in a 1 M HCl solution

23. New epoxy resin as a corrosion inhibitor for the protection of carbon steel C38 in 1M HCl Experimental and theoretical studies

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In this work, we synthesized a new organic compound type epoxy resin namely N, N, 1 tri (oxiran 2 ylmethoxy) 5 ((oxiran 2 ylmethoxy)thio) 1H 1,2,4 triazol 3 amine (TTA) used as corrosion inhibitor of C38 in an acid medium 1 M HCl The corrosion inhibition process of C38 in 1 M HCl has been studied by the PDP and EIS, the surface morphologies without and with inhibitor was examined by the SEM and in the theoretical calculations we used the DFT and Molecular Dynamics simulations Potentiodynamic polarization curves showed that the TTA affects both cathodic and anodic current density; we can classify it as a mixed type inhibitor, the electrochemical impedance measurements confirm the results obtained by the polarization curves, they indicate that inhibitory efficiency increases with the increasing concentration to reach 92% at 1 mM TTA The effect of temperature on the corrosion behaviour with the addition of TTA was studied in the temperature range 293-323 K

24. An experimental evaluation of a new 1,2,4 triazole derivative as a potential corrosion inhibitor for carbon steel in HCl

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In the present study, we manifest the usefulness of a novel 1,2,4 triazole derivative; following many works on this family of compounds; namely 5 hexylsulfanyl 1,2,4 triazole (HST) in inhibiting the carbon steel (CS) corrosion in 1 0 M HCl using mass loss measurements, electrochemical, scanning electron microscopy coupled with X ray detection (SEM EDX), X Ray diffraction (XRD) We have found that inhibition efficiency can reach 97 % based on electrochemical data Electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization (PDP) results suggest an increased impedance in the presence of HST and mixed nature of inhibitor action, respectively Both the gravimetric study and electrochemical measurements are in good agreement and have shown that that the optimal concentration of HST is 10 3 M The compound HST mitigates corrosion at the temperature range of 298 K338 K, with an inhibition efficiency of 89 % at 338 K

25. Inhibiting effect of the Fruits of Schinus Terebinthifolius essential oils on corrosion of carbon steel in 1M HCL

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The corrosion of a metal is its deterioration by a chemical and/or electrochemical reaction with the environment, hence the inhibiting action can only take place at one of the elementary steps of the reaction Green inhibitors are often oils or extracts obtained from barks, roots, leaves, seeds of plants and fruits, they have a non toxic character and they are composed of different products In this work the inhibitory effect of the fruits of Schinus Terebinthifolius essential oil was investigated for the corrosion of carbon steel in 1M hydrochloric acid solution, The hydro distilled oils obtained were tested at various concentrations and various temperature using, gravimetric analysis, polarization curves, electrochemical impedance spectroscopy (EIS), scanning electron microscopy techniques (SEM), Inductively Coupled Plasma Mass Spectrometry and infrared The inhibition efficiency has increased with the increase of the inhibitor concentration, reaching a value of up to 88% at 1g/L

26. Electrochemical, surface analysis, and computational investigations of newly imidazole derivative as corrosion inhibitor for C steel in diluted hydrochloric acid

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Under this work, imidazole derivative (LF2), LF2 was assessed as a corrosion inhibitor for C steel in 1 M HCl medium through the application of potentiodynamic polarization (PDP) and electrochemical impedance spectroscopy (EIS) techniques The experimental results reveal that the inhibition efficacy improved with increasing concentration but little dropped with increasing temperature, attaining 95 4% for 10 3 M at 303 K The PDP findings demonstrate that the LF2 molecule functions as a mixed type inhibitor The adsorption of LF2 followed the Langmuir isotherm and the estimated (Gads) value of LF2 suggested that its adsorption involves chemisorption The scanning electron microscopy (SEM) and UV visible examinations demonstrates that corrosion prevention is caused by the development of a protective layer on the metal surface

Thematic 4

Materials Sciences : Environment

1. An efficient Ce1 xZnxO2 x solid solution catalysts for the mineralization of diclofenac under solar light

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Several anti inflammatory drugs, such as diclofenac have been detected in surface water and groundwater sources worldwide Its persistence and resistance to conventional treatment methods make it a challenging target for removal For that, the heterogeneous photocatalysis seems to be an effectivemethod to mineralize the organic recalcitrant species using a light source However, photocatalysts frequently exhibit high photocatalytic degradation performance but a poor mineralization related to photogenerated electron hole pairs requiring good reactivity of O2 with the catalyst For this purpose, we combined two oxides ZnO and CeO2 to produce Ce1 xZnxO2 x solid solution (called CeZnx) (x=0 1, 0 2, 0 3,0 4) of fluorite structure typical of that CeO2 while ZnO has a zincite structure without any secondary phase The best photo mineralizer (67 5%) is Ce0 9Zn0 1O0 9 is fount after only a lightning time of 2h of which is more superior to that of pure CeO2 (20%)while ZnO does not mineralize

2. Synthesis of semiconductor based composites for use in the photodegradation of organic pollutants in water

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A novel photocatalytic composite was developed for the degradation of organic contaminants in water using sunlight By extrusion and calcination, a natural compound and titanium dioxide were homogeneously combined to generate the photocatalysts In this work the efficiency of the developed photocatalysts is performed to analyze the effect of metal oxide concentration with supporting material The photocatalytic composite reported here is economical, inert, stable, recyclable, and easily separated The photocatalyst demonstrated excellent activity under sunlight The kinetics of the reaction determined and analyzed in the tests carried out HPLC and UV was used to quantify the concentration of organic pollutants

3. The effects of NaOH concentration of Synthesis of Hydroxyapatite from Blast Furnace black Slag and evaluation of adsorption properties

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the use of alkali activated slags as sorbent can be a good opportunity to develop low cost, environmentally friendly, and sustainable materials The present research focuses black slagfor preparation of Hydroxyapatite (Ca5(PO4)3(OH)phase for adsorption applications, using crystal violet as a

model compound X ray diffraction (XRD), Fourier transform infrared (FT IR) spectroscopy measurement, scanning electron microscopy (SEM), and nitrogen adsorption-desorption tests for Brunauer Emmett Teller (BET) analysis techniques were performed on the samples to characterize the mineralogical and microstructural properties

4. Etudes, caracterisations des argiles mauritaniennes en vue de leurs utilisations comme membranes naturelles pour le traitement des eaux

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This work is part of a thesis on the development of Mauritanian clays and their use for the treatment of micropollutants The proposed clays were first characterized by different physicochemical techniques (X ray diffraction, infrared spectroscopy, thermal analysis, chemical analysis,) This characterization has allowed to select the most suitable samples for this type of applications, it has been made from several tests such as: - Adsorption isotherms - The effects of the quantity of clay and metal for each type of metal and each variety of clay - The establishment of retention mechanisms using Langmuir and Freundlich models A correlation with the clay microstructure will also be performed by scanning electron microscopy observations - In application, membranes will be established to test their ability to extract metals

5. Elaboration and structural investigation of the new phosphate (Ba, Zn)3Fe4(PO4)6

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The novel phosphate (Ba,Zn)3Fe4(PO4)6 was obtained under hydrothermal conditions and characterized by means of single crystal X ray diffraction The title compound crystallizes in a Howardevansite like structure with the triclinic system, space group P 1 and unit cell parameters: a=6 3449 (2) , b=7 9001 (2) , c=9 3132 (2) a=104 869 (1) ,108 282 (1) 301 (1) , Z= 2 All constitutive atoms of the asymmetric unit are located in the general position 2i except Ba(1)2+ and Zn(2)2+ cations that are on two inversion centers in the Wyckoff positions 1g(1) and 1h(1) respectively This crystal structure is made up of kinked chains of edge sharing polyhedra based on [Fe(1)2O10] and [Fe(2)2O10] dimers interconnected by Zn(1)O5 Neighboring chains are held together by regular PO4 tetrahedra and arranged in sheets stacked perpendicular to [010] direction This polyhedral configuration results in tunnels running along a axis that accommodate Ba(1)2+ and Zn(2)2+

6. Structural properties analysis of a ternary phosphate based glass system

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Potassium calcium phosphate glasses were synthesized using the melt quench technique, and the amorphous nature of the prepared material was approved by X ray diffraction (XRD) Scanning Electron Microscopy (SEM), Fourier Transform Infrared (FT IR), and Raman spectroscopy also studied the ternary glass system prepared Besides, their physical properties, such as density and molar volume, were studied The substitution of K2O with CaO causes a decrease in the molar volume and a rise in the density Infrared and Raman s spectroscopies detect the formation of P O Ca novel bonds that substitute P O K old bonds

7. Ag4CoFe2(PO4)4: synthesis, crystal structure, and electrical and magnetic behaviors

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Ag4CoFe2(PO4)4, a new orthophosphate,

has been developed in both single crystal and powder forms This phosphate s structure is made up of a combination of FeO6 and CoO6 octahedra, as well as PO4 tetrahedra that share corners and edges and form an infinite number of layers perpendicular to the [010] direction In the crystal structure s cavities and interlayer space, Ag+ cations can be located Furthermore, X ray powder diffraction analysis was used to confirm the purity of the synthesized powder The vibration modes of the PO4 tetrahedra are considered to be responsible for the bands observed in the infrared and Raman spectra The results indicated the mobility of Ag+ in the layered structure with an ionic conductivity of 2 6 103 S cm 1 at 773 K and an activation energy of Ea = 1 17 eV With a Curie Weiss constant of = 119 39 K, the magnetic investigation revealed antiferromagnetic order below the temperature of TN=10 K

8. Application du plan composite central pour l optimisation du developpement d un geopolymere a base de metakaolin comme adsorbant pour le traitement de l eau

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Les geopolymeres a base de metakaolin (MKGP) ont ete optimises en faisant varier les conditions de fonctionnement a l aide d un plan composite centrale (CCD) et de la methode de la surface de reponse (MSR) afin d optimiser les variables de fonctionnement affectant la formation d un MKGP et leur efficacite d adsorption Le MKGP a ete caracterise et teste pour l elimination du bleu de methylene (BM) dans un environnement aqueux Les resultats montrent que le MKGP5, dont la structure est la plus organisee, presente la plus grande efficacite d elimination du BM Des parametres tels que la dose d adsorbant, le pH, le temps de contact, et la concentration initiale de colorant ont ete optimises afin d ameliorer l efficacite de l adsorption du BM pour ameliorer l efficacite de l adsorption de BM Les resultats ont egalement demontre la precision et la faisabilite de la simulation CCD pour developper un adsorbant geopolymere bien converti pour le traitement de l eau

9. Plasmonic nanoparticles synthesis and their application for enhancing visible absorption of dye molecules

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Gold nanoparticles (AuNPs) have received considerable interest due to their unique properties Their distinct localized surface plasmon resonance, their biocompatibility and ease of surface functionalization make them attractive for many applications Surface enhanced absorption is a plasmonic effect related to surface enhanced fluorescence, Raman scattering, infrared and visible regions of light spectrum Azo dyes have strong light absorption in visible and AuNPs can function as nano light sources owing to LSP modes, by combining the two materials, surface enhanced absorption of the dye occurs in the visible region of the spectrum In this work, AuNPs were synthesized in aqueous solution then transferred to organic solvent Different concentrations of AuNPs were added to the azo dye; Disperse Red 1, and then absorption was examined by UV Visible analysis Our study demonstrates that the inclusion of plasmonic nanoparticles enhances the absorption of the azo dyes in the visible region

10. Effect of the Na2O on the structure and chemical durability of the xNa2O (45 x) B2O3 yP2O5 zMnO system borophosphate glasses

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Borophosphate glasses having the compositions xNa2O (45 x)B2O3 yP2O5 zMnO were prepared using the conventional melt quenching technique Several methods, including X ray diffraction, Fourier transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), were used to characterize the produced materials The absence of crystal structure in the prepared

phosphate glasses was confirmed by X ray diffraction (XRD) studies The chemical durability of these glasses increases with increasing Na2O content The relationship between structural changes and composition was studied by measuring the density and glass transition temperature Tg The results obtained show that the glass transition temperature and chemical properties increase with increasing sodium oxide compositions in all the glasses studied These experimental results act that Na2O lowers the melting point and increases the strength of glasses

11. Diode red light induced holographic gratings in smart azo polymer materials

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Holographic recording in azopolymer materials has been widely investigated and intensively performed with one color polarized resonant blue/green lasers Unlike, very few attempts were carried out to induce grating formation with two non resonant interfering beams, i e , red light, where this opens way to make azopolymer materials responsive to commercially available and cheaper lasers, i e , diode lasers In this presentation, we report on grating formation, by photo orientation, using non resonant low intensity laser at temperatures far below the polymer's glass transition temperature The finding of this work will attract much interest to the fundamental understanding of light induced anisotropy, and may allow miniature diode lasers to be efficiently used for photonic applications

12. Adsorption of levomepromazine drug using hydroxyapatite

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The objective of this work is to remove the residues of the drug [levomepromazine] from wastewater using an environmentally friendly material by the technique of adsorption, in our work we based on the preparation of hydroxyapatite (HAp) according to the method of dissolution/precipitation of natural phosphate This prepared material was characterized by various analytical techniques to determine the physico chemical properties of the prepared materials, namely X ray diffraction, IR spectroscopy for use as an adsorbent to eliminate the discharge of this study drug According to the results obtained by the study of adsorption, namely, the dosage of the adsorbent, the contact time, the initial concentration of the adsorbate, and the pH show that this material has an important role in the retention of levomepromazine and that these results are encouraging and worth pursuing for other organic and inorganic pollutants

13. Study of the adsorption process of levomepromazine by a amino acid (glycine) grafted hydroxyapatite

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The main objective of this work is to remove the drug levomepromazine by a process of adsorption on the surface of calcium phosphate hydroxyapatite CaHAp We proceeded to the grafting of glycine at different concentrations on the apatitic matrix HAp which was prepared according to the method of dissolution/precipitation of natural phosphate from the region of Khouribga deposits with atomic ratio Ca/P = 1 67 The pH of the solution was controlled during the grafting reaction (pH $>$ 10) The hybrid organic inorganic CaHAp (gly) species obtained were characterized by different techniques to determine their physicochemical properties, namely X ray diffraction (XRD), Fourier transform infrared spectroscopy (FT IR) The adsorption process was carried out at room temperature in order to study the factors that have an impact on the retention of pollutant by the adsorbent, such as the contact time, the dosage of the adsorbent, the initial concentration of the adsorbate and ph

14. Physico chemical Properties and durability of fly ash based geopolymer

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The aim of this work is to study the influence of Na2SiO3/NaOH mass ratio and curing time on the mechanical and microstructural properties of low calcium fly ash based geopolymer FA GP Thesamples were synthetizedwith different mass ratios (2 5 4 6) and curing times (2h 12h 24h) at 60 C The optimal formulation with the highest compressive strength was determined In addition, the durability of the optimized formulation geopolymer pastes was undertaken in this study, by evaluating the fire and acid attack resistances Fire resistance was evaluated by heating the FA GP pastes at 800C for 2 h Acid resistance was studied by immersing specimensin a 6% of acetic acid CH3COOH (GPFA CH3COOH) andhydrochloric acid HCl (GPFA HCl) for 2 months The samples exposed to acidic environment show a very porous structure with some micro cracks, inducing a decrease of the residual compressive strength FTIR analysis showed that the geopolymer gel deformed after heating to 800 C

15. Experimental and theoretical partial and integral enthalpies of mixing of liquid quaternary Cu In Sn Zn alloys

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In this work, the partial and the integral enthalpies of mixing in the Cu-In-Sn-Zn liquid Quaternary alloys have been measured at 500 C for seven started ternary sections with dropping pieces of pure copper to molten ternary In x Sn y Zn z : In 0 475 Sn 0 475 Zn 0 050 (Section A), In 0 450 Sn 0 405 Zn 0 100 (Section B), In 0 373 Sn 0 371 Zn 0 256 (Section C), In 0 333 Sn 0 333 Zn 0 334 (Section D), In 0 100 Sn 0 800 Zn 0 100 (Section E), In 0 050 Sn 0 900 Zn 0 050 (Section F), and In 0 900 Sn 0 050 Zn 0 050 (Section G) A biphasic domain (solid liquid) at the experimental temperature has been identified for each of the studied sections On the other hand, three different extrapolation models, such as Muggianu (as a symmetric model), Hillert (as an asymmetric model), and Chou (as a general solution model), were used to calculate the enthalpy of mixing in the Quaternary alloys The estimated values were compared with the experimental values

16. Prospective silver ion based conductors Ag2MII3(HPO4)(PO4)2(MII=Co, Ni) : Geometry and energy simulation

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The X ray diffraction is a potent tool for describing the atomic structure of crystalized solid state matter and can be used to analyze the phenomena occurring in functional materials For instance the fundamental procedures for the hopping of mobile species from one crystallographic site to another, that occurs in electrochemical energy storage materials Using a combined approach based on CHARDI /BVS and BVSE calculations, a modeling of Ag+ ion diffusion pathway was carried out for Ag2MII3(HPO4)(PO4)2 (MII=Co, Ni) phosphates The rapid silver diffusion barriers in the two phases are closely dependent on the kind, the position of the mobile cation and the migration path The (BVSE) results reveal that the two compounds display one dimensional migration along [100] with an activation energies of Ea(Co)=0 096eV and Ea(Ni)=0 101eV Substitution of Ni2+ by Co2+ cations reduces slightly the simulated ionic conductivity at 299K from 4 7 10 4 S cm 1 to 4 049 10 4 S cm 1

17. Synthesis, structural characterization and magnetic properties of CoInOPO4 with the a Fe2OPO4 structure

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The phosphate CoInOPO4 was synthesized using the sol gel method and its crystal structure was established from powder X ray diffraction data using Rietveld method This compound was additionally examined by scanning electron microscopy (SEM), infrared and Raman spectroscopy to provide supplementary structural information CoInOPO4 is isotypic with the mixed valence compound a Fe2OPO4, which crystallizes in the orthorhombic symmetry with the space group Pnma The structure of this phosphate consists of a three dimensional network built up from (Co(2)/In(2))O6 octahedra, (In(1)/Co(1))O5 square pyramid, and PO4 tetrahedra Infrared and Raman phonons analysis were provided and the temperature dependence Raman spectroscopy strongly suggests a high temperature structural instability (around 600 C) The magnetic investigation revealed a Curie Weiss temperature of this phosphate equal to 47 79 K, indicating that the dominating interactions are antiferromagnetic

18. Transforming Brick Waste into Sustainable Geopolymer: A Promising Solution for the Construction Industry

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One barrier to widespread geopolymer use is the lack of industry standards and norms It might be difficult to assure the quality and uniformity of geopolymer materials without specific rules for manufacture and testing the cost of manufacture may be greater than that of standard cement based products, which might be a barrier to adoption

were significantly degraded by the presence of the brick waste 7 MP for 5% waste material 5 MP for 10% waste material and 3 MP for 25% waste material, the compressive strength of the powder of bricks waste was 1 5 MPa, the deleterious effect of this waste brick on the mechanical resistance may arise from the presence of high calcium oxide ratios, even if the mechanical resistance decreases the geopolymere are sufficiently strong to withstand a small percentage of brick waste

19. Synthesis and characterization of high quality MAPbCl3 thin films via hot airflow

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The aim of this work is to study the advantage of a hot airflow step performed during synthesis of MAPbCl3 by spin coating process The effect of airflow position and temperature on the structural, morphological and optical properties of the prepared films has been studied The experimental results show a distinct dependency of the perovskite physical properties on temperature and position of the airflow Increasing the airflow temperature from 50 C to 150 C results in a net improvement of the continuity and crystallinity of the prepared films Also the distance between the airflow and the films has been varied from 5cm to 15cm for different airflow temperatures (50 C 150 C) Continuous MAPbCl3 layers with good homogeneity are obtained for low distances (5cm) At this distance, SEM images show high homogenous nucleation with the surface nearly entirely covered when the airflow temperature reaches 100 C

20. Investigation of Trace Elements in Some Spices Commercialized in Morocco by Inductively Coupled Plasma Mass Spectrometry (ICP MS)

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In recent years, there has been a growing emphasis on monitoring the levels of trace elements (TEs) in spices The aim of this study was to assess the levels of lead (Pb), cadmium (Cd), and arsenic (As) in commonly available

spices in Morocco, using inductively coupled plasma mass spectrometry (ICP MS) The obtained results were compared against the maximum limits (MLs) established by Moroccan legislative decree and international organizations The risk associated with TEs was evaluated based on health based guide values, such as the provisional tolerable weekly intake (PTWI) and the tolerable weekly intake (TWI) Most of the analyzed TEs in the samples were found to be within the MLs set by national and international regulatory agencies However, some samples showed Pb levels that exceeded the MLs, although there is no safety risk for consumers It should be noted that minimizing long term exposure to these elements is vital to ensure food safety and alleviate potential risks

21. Hydrothermal synthesis and characterization of three dimensional Bi2WO6 and Bi2MoO6 for enhanced visible light photocatalytic reduction of CO2 to CH4

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For decades, global warming and the production of alternative fuel sources have been two major challenges for humanity, with CO2 emissions being the main problem Photocatalytic reduction of CO2 to hydrocarbons using solar energy is therefore considered a still needed solution In this study, bismuth tungstate Bi2WO6 and bismuth molybdate Bi2MoO6 were synthesized by the hydrothermal method using sodium oleate as a surfactant The samples were characterized using an X ray diffractometer (XRD), scanning electron microscope (SEM), transmission electron microscope (TEM), and UV vis diffuse reflectance spectroscopy (UV DRS) This work aims to compare the efficiency of the application of Bi2MoO6 materials with the Bi2WO6 catalyzed process in the photocatalytic reduction of CO2 to CH4 to be determined later

22. The Effect of Li_2O/K_2O Ratio on the Electrical and Dielectric Properties of $Li_2O - K_2O - MoO_3 - P_2O5$ Glasses

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The influence of Li_2O/K_2O ratio on the electrical and dielectric properties of $xLi_2O - (25-x)K_2O - 25MoO_3 - 50P_2O_5$ glasses with x values varying from 0 to 20 was reasonably evaluated. The structural characterization of the synthesized glasses using FTIR and Raman spectroscopies suggests that the substitution of Li_2O by K_2O changes the network's structure. Indeed, the results show the establishment of a more open system and facilitate the movement of the charge carriers (Li^+) through the network, showing a decrease in the activation energy. Consequently, Li^+ ions generate bonding defects in the glassy lattice, leading to a growth in the dielectric parameters. Thus, the conductivity's temperature dependency indicates the glasses' semiconducting character.

23. Synthesis of nitrogen doped ZnO nanoparticles by sol gel process for UV light photodegradation of azo dye

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Pure and nitrogen doped ZnO materials were synthesized by the sol-gel method using zinc acetate as the precursor and urea as the nitrogen source The obtained materials were characterized by X ray diffraction (XRD), scanning electron microscopy (SEM), Fourier Transform infrared spectroscopy (FTIR) X ray diffraction study indicates the formation of nanoparticles N doped ZnO with wurtzite structure The infra red spectroscopy analysis confirmed the presence of nitrogen in ZnO lattice Scanning electron microscopy (SEM)

analysis showed nono spherical shape of pure and N doped ZnO samples The photocatalytic activity of ZnO and N doped ZnO was evaluated by measuring the rate of methylene blue (MB) degradation under Ultra violet light (UV light) The N doped ZnO shows higher photocatalytic activity compared to undoped one The enhancement of photocatalytic activity of the N doped ZnO semiconductor could be mainly due to its capability in reducing the electron-hole pair recombination

24. Elaboration of fired clay composite employing coal waste and olive pomace as raw materials

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This study investigated the suitability of coal waste and olive pomace as raw materials for composite materials Coal waste was evaluated as a potential replacement for clay, while olive pomace was considered an additive Results showed that coal waste is predominantly composed of quartz, chlinochlore, and muscovite, while olive pomace contains a high amount of organic matter Fired samples were produced by mixing different weight percentages of olive pomace with coal waste and then sintering them at 900 C The properties of the samples were characterized by X ray diffraction, Fourier transform infrared spectroscopy, and scanning electron microscopy The addition of olive pomace led to a significant reduction in bulk density and compressive strength, while causing an increase in apparent porosity and water absorption

25. Synthese et caracterisation des mousses geopolymeres et applications dans l adsorption des metaux lourds

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Les mousses geopolymeres sont des materiaux aluminosilicates utilises dans la decontamination des effluents liquides Ils sont fabriques soit d une facon directe ou indirecte L utilisation des geopolymeres poreux presente un avantage certain dans le domaine du batiment mais egalement dans le domaine nucleaire ou chimique

26. Study of thermal and mechanical properties of clay based material with Alfa fibers

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Bio based materials are of tremendous interest due to their abundance and the enormous potential they exhibit as a replacement for the commonly used industrial construction materials In this context, an experimental study has been conducted on clay based materials based of clay matrix, with the goal of improving their properties by the incorporation of an additional bio based component, such as fibers, in this case Alfa fibers For the thermo mechanical characterization, the thermal conductivity is determined using the hot plate method on the composite clay Alfa fibers with Alfa fibers percentages ranging from 0% to 4% In addition, the compressive and flexural tensile strengths are obtained using a mechanical press

27. Development and optimization of bentonite adsorbent for water treatment

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The focus of this research is on developing a novel adsorbent for wastewater treatment Raw bentonite was modified with a surfactant to enhance the removal efficiency of basic dyes The adsorption capacity of raw bentonite and modified bentonite for cationic and anionic dyes from aqueous solutions was examined and evaluated Research outcomes revealed that modified bentonite, effectively removed the anionic and cationic dyes Various influential factors, such as dye concentration, adsorbent dosage, pH of the solution,

contact time, and temperature, were investigated to optimize the adsorption capacity of MBt The adsorption mechanism of both dyes was well described by the pseudo second order and Langmuir models Thermodynamic study revealed that the adsorption process was exothermic for cationic dye and endothermic for anionic dye These results highlight the efficiency of employing surfactant modification techniques in the development of effective adsorbents for wastewater treatment

28. Synthesis, characterization and photocatalytic properties of CaO B2O3 V2O5 Borovanadate glasses

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Advances in technology and engineering have continued to develop in close connection with the development of new processing methods and functional materials Until now, the presence of organic pollutants in water is one of the main problems confronting modern society, causing serious and irreparable damage to the natural world In this work, we report the structural characterisation and photocatalytic activity of a new photocatalyst belonging to the borovanadate glass system The glasses were prepared by the melt quenching method X ray diffraction was used to demonstrate the amorphous nature of the glass samples Infrared (FTIR) and Raman spectra show that the glass materials studied contain mainly BO3 and BO4 units with the presence of vanadium in VO4 or VO5 The photocatalytic activity for all the prepared glasses shows a higher degradation performance, and the results indicate that the glass with a higher percentage of vanadate has the highest removal efficiency of about 99%

29. Valorization of biomaterials based on calcium phosphate

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The Calcium phosphate is used in medical applications, because of its tolerance by the organism, and in environmental applications as bio sorbent to remove heavy metals, dyes and some drugs from water The Adsorption is attracting increasing attention as an attractive and technology for water treatment, since it has several advantages over other techniques (efficiency, high profitability) The calcium phosphate Ca10(PO4)6(OH)2 (Hap natural) bio nanoparticles, were prepared and thoroughly characterized using various physicochemical methods Inthis work we have studied some parameters that influence the adsorption process such as the contact time, the initial concentration of the adsorbed molecule, the pH We also developed potentiometric techniques with variable hydration time This led to the point determination of the point of zero charge of the rod of bio calcium phosphate and the types of active sites present on its surface which grants it properties of sorption

30. Optimization of CIP adsorption onto Moroccan oil shales using a factorial design

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Morocco has significant mineral resources, such as oil shale, which is an important factor in the development of its industrial activities Oil shale in the Rif region is currently a very interesting resource for alternative materials for use in the environment, especially in the treatment of antibiotic rich wastewater In this study, raw oil shale was used for the adsorption of a pharmaceutical antibiotic (CIP) Initial concentrations of CIP, contact time, and adsorption mass were considered to be the most important variables affecting the method of adsorption The significance of this work is the application of 15 factors in designing trajectories to achieve optimal conditions for ciprofloxacin absorption in oil shales

31. introduction to multifunctional coatings surfaces

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Advanced multifunctional coatings are widely used because of their properties They are used in aeronautics, transportation, biomedicine, electrical and electronic equipment, etc, thermal barrier coatings for gas turbine engines, nanostructured coatings, nanoparticle based thin film coatings, microstructural design of hard coatings, anti corrosion coatings, nanoparticle based thin film coating, hard coatings, anti corrosion coatings, advanced multifunctional coatings for machining vibration, etc In this work, multifunctional surface coatings will be defined and examples of the use of these surface protection products will be given Integrating functions into materials Function structure relationships will be defined and competence in the multifunctional approach will be developed

32. Electrochemical Evaluation of the Effect of pH and Temperature on the Degradation of Lithium Disilicate Glass Ceramics

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Lithium disilicate glass ceramics have good properties for restorative dentistry, but can degrade in acidic environments, leading to clinical problems This study looked at the electrochemical behavior of the ceramics at different pH levels and temperatures to understand the degradation process Tests showed that the solubility of the ceramics increased with lower pH and higher temperatures, and tests on degraded ceramics showed an amorphous layer on the surface Quantitative methods are necessary to evaluate the electrochemical properties of these ceramics in the oral environment This study provides important insights into the degradation mechanism and can guide development of more durable restorative materials

33. Functionalized Hydroxyapatite as an efficient flame retardant for textile materials: Preparation and combustion behavior

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poly acrylic acid (PA) resin is widely used as coatings bases for textile fabrics For this aim, several coating formulations were prepared using the Hydroxyapatite nanoparticles grafted with different percentages of aminotrimethylenphosphonate (HAP AMP) PU PA resins to improve the fabrics; flame retardant (FR) properties The different concentrations of HAP AMP Nanoparticles with PA resin were applied on one side of a cotton/ polyester blend fabric by the knife coating method in different thicknesses The vertical flame test according to ISO 6940: 2004(F) standards of functionalized fabrics showed that the HAP AMP nanoparticles applied to the fabric have a strong improvement in the flame retardant property Thermogravimetric analysis (TGA) shows that the treated fabrics with HAP AMP nanoparticles were more stable and had a high percentage of residue, Scanning Electron Microscope (SEM), mechanical properties have also been investigated

34. Photocatalytic enhancement of a ferroelectric lithium tantalate doped lithium niobate LiNb1 xTaxO3 for organic dyes degradation

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Inthis investigation we have synthesized the LiNb1 xTaxO3 (x=0 and 0 5) ferroelectric powder via aconventionalsolid statereactionmethod Thecrystalstructureofthe samples were characterized by X ray diffractometer The size and surface morphology of the particles were investigated via scanning elec-

tron microscopy (SEM/EDS) and transmission electron microscopy (TEM), however the surface analysis and the vibrational modes of catalysts were determinate by XPS and Raman The photocatalytic activity of the catalysts were investigated using a Rhodamine B (RhB) aqueous solution as a model organic substrate The results showed that the LiNb1 xTaxO3 (x=0 5) powder has excellent photocatalytic degradation performance

35. Synthese de nouveaux nanomateriaux ferrite pour des applications industrielles

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In this paper, the magnetic properties of Ni0 5Co0 5Fe1 59Mo0 1Gd0 2Sm0 1Tb0 01O4 nanoparticles coated with oleic acid prepared for the first time by the one step co precipitation method were studied using a Magnetic Property Measurement System (MPMS) TGA and DSC analysis was used to analyze the thermal behavior of the obtained precipitate (uncalcined powder) The formation of a pure phase of spinel nanoparticles coated with oleic acid with a crystallite size of 21 nm was confirmed by X ray diffraction (XRD) The estimated cationic distribution confirms the formation of the mixed spinel structure The formation of crystallographic sites of spinel structure is the presence of oleic acid on the surface of nanoparticles was confirmed by (FTIR) (TEM) shows that the nanoparticles have an irregular shapeThe magnetic properties were determined at three different temperatures (5, 80 and 300 K) and revealed that the synthesized material has a superparamagnetic behavior

36. Rare Earth Orthovanadates: Synthesis, characterization and photocatalytic application

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Recently, rare earth orthovanadates (RVO4), exhibit excellent visible light photocatalytic activity due to their important properties such as visible light response, low bandgap, low cost, non toxicity, chemical stability, corrosion resistance, low environmental impact and morphology control Generally, they are used as a very promising photocatalyst for photocatalytic degradation of organic pollutants Our study consists of preparing RVO4 by facile co precipitation method for photocatalytic degradation of methylene blue (MB) The prepared material was characterized using different structural and micro structural techniques such as the characterization by X ray diffraction (XRD), UV Vis diffuse reflectance spectrum (DRS), transmission electron microscopy (TEM), and Raman spectrometry The degradation efficiency was evaluated by photocatalytic degradation of an methylene blue (MB)

37. Characterization of belitic phase elaborated from shell and glass powders

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The aim of this study is to use waste glass as a source of silicium oxide SiO2 and shells as a source of calcium carbonate CaCO3 to replace traditional raw materials for the production of belite rich clinkers and to investigate the hydration characteristics of the resulting cements After grinding, the raw materials were mixed to synthesize the belite phase in a heat treatment from 500 C to 1000 C The clinkers produced were rich in belitic phase Ca2SiO4 Anhydrous and hydrated C2S samples are characterized by X ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X ray spectroscopy (EDS) and Fourier transform infrared spectroscopy (FT IR) We have attempted here to review the development of high belite cements by simple heat treatment at relatively low temperature and low CO2 emission

38. Electrosynthese en milieu phosphorique d'un materiau pseudo capacitif utilise dans le stockage d'energie

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L'electrosynthese du materiau phosphate est realise en milieu acide phosphorique Le materiau obtenu en film mince a ete caracterise a partir d'une serie d experiences comprenant une etude de diffraction des rayons X, par microscopie electronique a balayage, et par spectroscopie infrarouge La performance electrochimique des films minces obtenus a ete etudiee par voltamperometrie cyclique (CV) et par charge decharge galvanostatique (GCD) en utilisant differents electrolytes Les resultats electrochimiques indiquent que notre materiau a une capacite specifique elevee de l ordre de 520,3 F g 1 a 2 A g 1

39. Mineralogical study of a binder based on alkali activated coal gangue

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The activation of materials from mining waste is gaining more and more interest from researchers and industrialists in the production of ecological binders In this paper, we explore the complementary techniques of scanning electron microscopy and X ray diffraction methods for the mineralogical determination of the formed phases after the activation of coal gangue as raw material incorporated by a certain percentage of lime The Alkali Activated Coal Gangue Lime synthesis method was carried out at room temperature in two consecutive stages, the first consists of grinding and the second consists of activation by NaOH (5M) followed by a 28 day cure The obtained results by XRD and SEM EDS are concordant and complementary and indicate that the prepared product consists mainly of phases of hydrated calcium aluminate silicate (C A S H), hydrated alkaline aluminate (N A S H) and additional portlandite Ca(OH)2

40. Use of algae based materials for wastewater treatment

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The present work consists of studying the Adsorbency of Methylene Blue on three algal origin materials, Gelidium sesquipedale, Gelidium sesquipedale residue and a mixture of diatom and Gelidium sesquipedale X ray diffraction shows that DGS is rich in silicate minerals and GS and RGS in Magnesium and Calcium Carbonate Adsorption analysis reveal that the equilibrium time is a function of the initial dye concentration Equilibrium is established after 10 min, 40 min and 60 min for BM solutions at 4 12mg/L, 8 25mg/L and 16 50mg/L respectively The maximum adsorption capacity determined by the Langmuir mathematical model is 4,28mg g 1 for GS, 6mg g 1 for RGS and 14,7mg g 1 for DGS, The adsorption of Methylene Blue on DGS is described by the pseudo second order model, while that on GS and RGS is described by pseudo first order

41. Chloride transport resistance of aerated Alkali activated fly ash/electric arc furnas slag mortars

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This research aimed to develop aerated alkali activated mortar and study its resistance to chloride ions Three different lightweight alkali activated binder mortars cured at room temperature were prepared from two Moroccan local waste materials - electric arc furnace slag (EAFS) and class F fly ash (FA) - as a partial replacement for cement and sand Sodium hydroxide solution (4M) was used as an alkali activator in the mixture Mortar specimens were cured in water at 20 2C for 28 days and then exposed to a chloride solution for 10 and 30 days The characterizations are

deduced from the techniques of X ray fluorescence (XRF) and X ray diffraction (XRD) Resistance to chloride ingress was evaluated, high EAFS content can significantly improve mortar resistance to chloride penetration

42. Algebraic description of the vibrational spectroscopy of HCN and HNC isomers

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HCN was first observed in the Earth's atmosphere in 1981, it is released from biological sources and industrial processes, it is of interest as an atmospheric tracer of biomass burning, and it is Involved in the the formation of some atmospheric compounds Theoretical calculations are crucial for the prediction and interpretation of spectroscopic data The algebraic approach to resolving the vibrational Hamiltonian where the Hamiltonian is transformed into an easy to solve algebraic representation is an interesting alternative to traditional methods for calculating molecular vibrational spectra such as ab initio methods In this work, the full vibrational spectra of the isomers HCN/HNC are calculated and compared with the available experimental data using an algebraic realization of the Hamiltonian based on the monodimensional and bidimensional limits of the vibron model This algebraic approach provides multiple advantages over the usual ab initio calculations

43. Conversion catalytique du 4 nitrophenol en 4 aminophenol par les nanoparticules de nickel supportees sur un hydroxyde bimetallique

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Les materiaux a base de nanoparticules de nickel (Ni NPs) presentent un potentiel prometteur pour diverses reactions catalytiques Dans cette etude, nous avons developpe une methode de synthese appropriee pour obtenir des Ni NPs supportees sur un hydroxyde bimetallique, offrant des avantages en termes de stabilite et d activite catalytique Les nanoparticules obtenues ont ensuite ete employees pour convertir le 4 nitrophenol (4 NP) en 4 aminophenol (4 AP) Les resultats experimentaux ont revele d excellentes performances du catalyseur, permettant une reduction d environ 97% du 4 NP en 4 AP en utilisant seulement 2 mg de catalyseur en 12 minutes Cette etude souligne le potentiel des Ni NPs supportees comme catalyseurs efficaces pour la conversion du 4 NP en 4 AP et pave la voie a des recherches et applications futures dans le domaine de la catalyse

44. Synthesis and study of titanium integration into the sulfoaluminate phase

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Portland cement emits a massive amount of harmful gases, the most important of which is carbon dioxide, which is responsible for global warming In order to develop commercially usable cements whose manufacture is accompanied by low industrial emissions of CO2, researchers have proposed to produce a new type of environmentally friendly cements or green cements such as calcium sulfoaluminate cements (Yeelimite) as an alternative to Portland cement In this work, the inclusion of titanium oxide in the structure of ye elimite (general formula: Ca4Al(6 x)TixO16S) was described The synthesis is carried out using raw materials: calcium carbonate (CaCO3), calcium sulfate (CaSO4), alumina (Al2O3) and titanium oxide (TiO2) Different mixtures were treated at different temperatures from 500 C to 1300 C The aim of this work is to study the behavior of sulfo aluminous cement in the presence of varying amounts of titanium oxide

Thematic 5

Physical Properties of Materials I

1. Study the effects of metal doping on electronic structure, magnetic and optical properties of two dimensional materials: Density function theory

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The study aims to investigate the effects of metal doping on the electronic structure, magnetic, and optical properties of two dimensional (2D) materials using density functional theory (DFT) The electronic, magnetic and optical properties of 2D materials are highly sensitive to the presence of dopants, making them promising candidates for a wide range of applications in electronics, spintronics, and optoelectronics In this study, various metal dopants, including transition metals and rare earth elements, are incorporated into 2D materials such as graphene, and transition metal through substitutional doping The results of the study provide insights into the mechanisms of metal doping on the electronic, magnetic, and optical properties of 2D materials, which can be useful for the design and optimization of materials for various applications

2. Etudes des proprietes electroniques et magnetiques des DMS pour la spintronique

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The ab initio study of electronic, magnetic properties and Curie temperature of DMS using combined-KKR-CPA method It is shown that thesubstitution by magnetic impurities induces a half metallic character and ferromagnetism in the system for different concentrations of ompurity The stability of magnetism between the ferromagnetic and DLM states as well as the mechanism of exchange interaction are discussed The density of states are plotted in the energy diagram for different concentrations of dopants The finding of this work confirms that the new compounds have a great potential for spintronic devices

3. A DFT study of electronic, magnetic, optical and transport properties of rare earth element (Gd, Sm) doped GaN material

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The main objective of this article is to deal with and establish a new type of transparent conducting material by doping Gallium Nitride (GaN) with rare earth RE (Gd, Sm) elements A theoretical study was performed by using the density functional theory (DFT) implemented in WIEN2k code and BoltzTraP package based on semi classical Boltzmann transport equation (BTE) within constant relaxation time and rigid band approximation (RBA)

4. etude les proprietes structural, magntique et dynamique de de composant SiGe dope par les metaux de transition

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pour calculer les proprietes structurales et thermodynamiques du compose hypothetique I V-IV SiGe en phase zinc blende Bon accord entre les valeurs calculees et theoriques du reseau constante, le module de masse et sa derivee, et l energie de cohesion est obtenue Nous calculons egalement les constantes elastiques

5. Propriete magnetiques et thermodynamique des systeme nano

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Nous avons etudie le comportement de compensation, le phenomene reentrant caracterisant les transitions de phase du premier ordre, et l effet de biais d echange se manifestant par des boucles d hysteresis asymetriques pour un nanotube coeur coquille avec spin mixte (1, 3/2) en combinant a la fois la theorie des champs effectifs et la technique de distribution de probabilite Parmi les resultats interessants figurent le comportement de compensation dans les cas ideaux et desordonnes, ou l on a remarque un comportement critique se manifestant par la persistance de l aimantation totale, le comportement de compensation accompagne des phenomenes reentrants, ainsi que du comportement multi boucles, effet d echange de biais, et la susceptibilite magnetique L energie interne, l energie libre de Helmohltz et la chaleur specifique a double pic sont egalement utilise pour invoquer l aspect energetique

6. Proprietes electroniques et magnetiques des nanorubans 1T TiSe2

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Motives par la synthese recente de TiSe2 monocouche, nous avons utilise des calculs de theorie fonctionnelle de la densite de pointe pour etudier les proprietes structurelles et electroniques des nanorubans en zigzag et en fauteuil de ce materiau Notre analyse revele que, a la difference des rubans d autres materiaux ultra minces tels que le graphene, les nanorubans TiSe2 ont des proprietes distinctives Pour les nanorubans ultra etroits a bords en zigzag, nous trouvons des oscillations paires impaires dans la largeur de la bande interdite, bien que leurs structures de bande presentent des caracteristiques similaires La passivation des liaisons pendantes avec de l hydrogene aux bords des structures influence la dispersion des bandes Nos resultats mettent en lumiere les proprietes caracteristiques des nanorubans en phase T de structures cristallines similaires

7. A study of the structural, electronic, optical, and lattice dynamical properties of AgGaS2 using density functional theory

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This study used density functional theory to investigate the electronic, optical, and lattice dynamical properties of AgGaS2 (AGS), a nonlinear optical crystal in the infrared region Four hybrid functional methods were employed, and the PBE0 method was found to produce theoretical results that were consistent with experimental values The electronic structure results showed that AGS is a direct wide band gap nonlinear optical crystal, and the energy band structure and density of states calculations revealed the contributions of different orbital electrons The optical prop-

erties were determined by the coupling between Ga and S atoms, and the crystal material exhibited strong absorption and reflection in the ultraviolet region and strong transmittance in the infrared region The study also reported the average static dielectric constant, refractive index, and birefringence of AGS

8. l etude des proprietes magnetiques et thermodynamiques des nanostructures type nanofil et nanotube a structure hexagonale: methode de Monte carlo

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Based on the metropolis algorithm, the M C method is used to study the magnetic properties, hysteresis loops and compensation phenomenon of a mixed spin (3/2,2) ferrimagnetic hexagonal ising nanowire with alternating layers These studies which were interested in the effect of longitudinal crystal field and exchange coupling constants on total and sublattice magnetization, susceptibilities, specific heat and internal energy as well as hysteresis loops which are studied for particular parameters showed from their results obtained different important magnetic phenomena such as seven and triple hysteresis loops at low temperature and one or double compensation temperatures under certain parameter values

9. Electronic and magnetic properties of ZnO doped with doubles impurities (Cr, Fe) :Ab initio calculations

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Electronic structure and magnetic properties of ZnO doped with single and double impurities Zn1 xCrxO, Zn1 xFexO, and Zn1 2xCrxFexO (x=0 03 and 0 06) are investigated using first principles calculations Based on the Korringa-Kohn-Rostoker method combined with the coherent potential approximation, we investigated the half metallic ferromagnetic behavior of doubles impurities (Cr, Fe) doped ZnO

10. Effect of size and shape of carbon quantum dots on their optoelectronics properties

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The zero bandgap is the major drawback that prevents the insertion of graphene as active layers in devices fabrication and strongly limits its applications in optoelectronics and photonics that require reactivity and photoluminescence The non zero bandgap canbe induced via quantum confinement by reducing the dimension of the 2D sheet to a 0D quantum dot (QD) by cutting two edges This generates QDs in different forms and shapes such as hexagonal, triangular, diamond, and rectangular Consequently, their physical properties, like electronic and optical ones, strongly depend on their size, their shape and their edge configuration

11. Isolants topologiques

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La structure electronique de ces materiaux presente une faible largeur de bande interdite (gap separant l etat de plus haute energie de la bande de valence, de l etat de plus faible energie de la bande de conduction) de l ordre de quelques dixiemes d eV Ce gap est donc plus proche de celui d un semi conducteur, que caracteristique d un bon isolant conventionnel (gap de plusieurs eV) C est dans ce faible gap que sont localises les etats de surface qui assurent la conduction electronique

12. Simulation des quelques proprietes de nanomateriaux par le modele d Ising

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Les applications des nanomateriauxsont multiples et touchent presque a tous les domaines de l industrie, leurs proprietes interessantes ne sont plus un mystere, en effet la decouverte du grapheme etde ses derives a ouvert un domaine de recherche tres actif, le nombre important d articles publiees ses derniers annees en temoigne,un des exemples les plus traite est le Core Shell1 Shell2 ou les interactions entre le Corre et le Shell1 d une part, du Shell1 et Shell2 d autre part, confirent ace type de nanomateriau desnbtissam drissi@fsr um5 ac maotre travailproprietes remarquable, notre travail sera consacre a l etude de quelques proprietes magnetiquesd un nano fil de section type Core Shell1 Shell2 par le modele d Ising et l algorithme de Metropolis

13. Structural, electronic and elastic properties of the cubic CaTiO3 under pressure: A DFT study

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Using the highly precise FP LAPW approach with GGA approximation, the structural, electrical, and elastic properties of cubic CaTiO3 have been measured from the pressure range of 0 120 GPa It has been observed that the lattice constant, bond length, and anisotropy factor all decrease as pressure increases Additionally, the compound s indirect band gap and brittleness shift to ductile and direct band gap, respectively, at 120 GPa Elastic wave velocities, material density, Debye temperature, and elasticity moduli all increase as pressure increases In spin dependent DOS figures, the compound s invariant anti ferromagnetic property under pressure is shown Our calculations correspond with theoretical and research results

14. electronics and magnetics owned by SiC

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To explore the electronic and magnetic characteristics of SiC doped and co doped with chromium (Cr) and manganese (Mn), ab initio calculations were done using the Korringa Kohn Rostoker (KKR) Green's function technique combined with coherent potential approximation (CPA) By comparing their total energies, the stability of the ferromagnetic and spin glass states is discussed We demonstrated that substituting Si with Cr/Mn causes ferromagnetism in the compound As a result, the metallic properties have been studied

15. Magnetic properties of (Fe-Ni) core-shell nanostructures: Heisenberg Monte Carlo simulations

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By performing atomistic simulations, we have studied some features of classical Heisenberg model using the statistical Monte Carlo method MC under the Hinzke-Nowak algorithm First, we have deeply explored magnetic and thermal properties of a core-shell nanosphere model and investigate the behaviors of the temperature dependent magnetization, magnetic susceptibility and phase diagrams for different possible exchange interactions Then, we have applied the same computational method to the real (Fe, Ni) nanostructure using experimental values of magnetic parameters for iron and nickel

16. Effet du dopage sur les proprietes electroniques et optiques des boites quantiques a base de graphene

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Les points quantiques a base de graphene sont des microparticules de dimension zero avec des proprietes electroniques et optiques distinctes, prometteuses et accordables Ces boites quantiques sont de plus en plus utilisees dans diverses applications electroniques telles que les cellules solaires en modifiant leurs proprietes electroniques et optiques Le dopage des heteroatomes est l un des moyens les plus connus pour ajuster leurs proprietes en fonction des besoins souhaites

17. A comparative study of Undoped and Fe doped of CsSnCl3 and CsPbCl3 for optoelectronics applications

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Among the many members of the perovskite family, the materials CsSnCl3 and CsPbCl3 were chosen for comparative analysis using first principles calculations In this study, the structural, electronic, and optical properties of pure metal (Fe) doped CsSnCl3 lead free perovskite and CsPbCl3 lead halide perovskite were calculated for use in solar cells and other optoelectronics applications The results show that the metal doping exhibits high absorption and conductivity compared to the pure counterpart due to the band gap reduction

18. Monte Carlo Study of Critical and Compensation Behaviors of Mixed Spin(1,3/2) Ising System with Interpenetrating Sublattices

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Monte Carlo simulation based on the Metropolis algorithm has been performed to study the magnetic properties of a mixed Ising ferrimagnetic model on a square lattice in which we have two interpenetrating sublattices that can take four values of spinsiA = 3/2, 1/2, alternated with spins that can take three values of spins Sj B = 1 The proposed model includes the bilinear interaction J2, the four spins interaction J4 and the next nearest neighbors interaction J and J The main attention was given to the study of the phase diagram for both transition and compensation temperatures after performing the exact calculations of the ground state for the model We explored the role of the different interactions in the Hamiltonian

19. Supraconducteurs topologiques, couplage faible et couplage fort, et chaine de Kitaev

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Les supraconducteurs topologiques sont une classe de materiaux qui presentent des proprietes quantiques uniques resultant de la relation entre la supraconductivite et la topologie On utiliser la forme de Bogoluibove de Genne pour passer a l'espace des impulsions, et on etudier la topologie du systeme a partir de deux types de couplage distincts, le couplage faible et le couplage fort Et on passe ou Kiteav Chain et on utilise les conditions sur les couplages pour distinguer entre le cas trivial et le cas non trivial

20. Drug Delivery: Role of nanomaterials in nanomedicine applications

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In this work, the importance of nanomaterials such as quantum dots in the nanomedicine is discussed For several years, quantum dots were studied and included in many applications due to their excellent high optical properties Like dyes, it was found that they can track biological molecules within the

living cells and due to this ability, they were introduced as drug carriers for drug delivery

21. First Principles Calculations of Thermoelectric Properties of IV-VI Chalcogenides 2D Materials

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A first principles study using density functional theory and Boltzmann transport theory has been performed to evaluate the thermoelectric (TE) properties of a series of single layer 2D materials The compounds studied are SnSe, SnS, GeS, GeSe, SnSe2, and SnS2, all of which belong to the IV-VI chalcogenides family The first four compounds have orthorhombic crystal structures, and the last two have hexagonal crystal structures Solving a semi empirical Boltzmann transport model through the BoltzTraP software, the electrical properties, including Seebeck coefficient, electrical conductivity, power factor, and the electronic thermal conductivity, are compute at three doping levels Furthermore,the lattice thermal conductivity of these materials is calculated Based on the highest values of figure of merit ZT of all the materials studied,the best TE material at the temperature range studied here is SnSe

22. Electronic and Magnetic properties of La doped SrRuO3 by GGA+U

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Recently, a spin glass state is experimentally observed with the suppression of ferromagnetism in doped polycrystalline Sr1 xLaxRuO3 Here, based on generalized gradient approximation plus U (GGA +U) by first principles calculations, in this presentation the magnetic and electronic properties of Sr xLaxRuO3 (x = 0, 0 125, 0 25, 0 5, 1) are studied The results obtained for Sr1 xLaxRuO3 give a ferromagnetic half metal ground state at 0 12 and 0 25, coexistence of a ferromagnetic half metal state and antiferromagnetic insulating state at x = 0 5 and an antiferromagnetic metal state at x = 1 Finally, La doped SrRuO3, when realized, can contribute to the development of devices and technology in spintronics

23. etude du premier principe de l effet de deformation et le ferromagnetisme demi metallique dans les alliages Cd1 xVxTe : Approches super cellulaires

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Dans ce travail, nous etudions l effet des dopants au vanadium sur les proprietes structurelles, electroniques et magnetiques des alliages CdTe dans une supercellule tetragonale 2 21 et une supercellule cubique 2 2 La demi metallicite qui apparait dans le Cd0,75V0,25Te est la plus favorable, avec une polarisation des spins de 100 % , et peut etre conservee sur une large gamme de contraintes a des temperatures de Curie superieures a la temperature ambiante Dans le cas du spin minoritaire pour Cd0 9375V0 0625T e et Cd0 875V0 125Te, le niveau de Fermi traverse la bande d energie, avec l absence de la bande interdite du demi metal Ces contraintes empechent de considerer ces alliages comme des demi metaux La difference etant tres simple, elle peut etre amelioree par l effet de deformation La stabilite des structures sous contrainte externe est evaluee par l energie de liaison du vanadium

24. Materiaux thermoelectriques utilisant des materiaux bidimensionnels

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Les materiaux bidimensionnels (2D), tels que le graphene, les dichalcogenures de metaux de transition (TMD) et le phosphore noir etc ont recemment suscite beaucoup d in-

teret en raison de leurs proprietes thermiques et electroniques uniques En raison de leur dimensionnalite reduite, ces materiaux presentent un facteur de merite (ZT) elevee, qui quantifient leur capacite a convertir la chaleur en electricite et vice versa En termes de proprietes TE, les materiaux 2D ont une conductivite thermique reduite par rapport aux materiaux 3D en raison de la restriction de la dispersion des phonons, et une conductivite electronique peut etre amelioree grace a l effet de confinement quantique, qui peut augmenter la densite d etats electroniques, en general, ces deux conductivites sont liees et ne peuvent donc pas etre controlees independamment

25. Nanomateriaux

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SPINTRONIQUE est un domaine pourtant jeune et issu du mariage entre les communautes du magnetisme et de la physique des couches minces a connu une expansion rapide depuis la decouverte de la magnetoresistance geante par Albert Fert et Peter Gr nberg en 1988 La portee de cette decouverte, son application rapide aux tetes de lecture d'une nouvelle generation de disques durs dix ans plus tard puis sa consecration par un prix Nobel en 2007 ont accentue d'autant plus cette situation Ce phenomene qui survient dans un empilement de couches minces de deux metaux ferromagnetiques separes par un metal non magnetique d'une dizaine de nanometres, permet le filtrage de spin lorsqu'un courant le traverse

26. Transport et performances thermoelectriques des feuilles de Ge carbure fonctionnalise au fluor

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Base sur des simulations de la theorie de la fonctionnelle de la densite, approximation GW + BSE et la theorie du transportde Boltzmann semi classique, la reponse electronique, optique et thermoelectrique des carbures Ge fluores bidimensionnels sont etudiees Trois configurations sont considerees, a savoir F CGe, CGe F, F CGe F pour explorer l effet a la fois de la distribution et de la couverture de la fluoration sur les proprietes etudier des carbures de Ge

27. A study by DFT of electronic, magneto optic and thermoelectric properties of co doped SnO2 by coupled Mn and A=Mo or Tc

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Spintronics combined with optoelectronics is new field that attracted a variety of scientific interests In this study, we examined the electronic, magneto optical, and thermoelectric properties of co doped SnO2 by coupled Mn and A=Mo or Tc Our results indicated that the Sn1 2xMnxMoxO2 and Sn1 2xMnxTcxO2 exhibit half metallic ferromagnet behavior using the TB mBJ A ferromagnetic ground state is present in the Sn1 2xMnxMoxO2, which the Zener double exchange mechanism may help to explain While, p d hybridization governs the ferromagnetism in the Sn1 2xMnxTcxO2 The investigation of optical and thermoelectric properties shows that these systems can absorb sunlight (visible region) These compounds have the figure of merit ZT at room temperature of 0 114 and 0 11 for Sn1 2xMnxMoxO2 and Sn1 2xMnxTcxO2, respectively As a result, we can say that these materials Sn1 2xMnxMoxO2 and Sn1 2xMnxTcxO2 are suitable for use in thermoelectric and Photovoltaic devices

28. les proprietes thermiques et thermoelectriques des materiaux

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Silicene, as a graphene like two dimen-

sional material, now receives exceptional attention of a wide community of scientists and engineers beyond graphene Despite extensive study on its electric property, little research has been done to accurately calculate the phonon transport of silicon so far In this paper, we study the thermal transport in silicene by using non equilibrium molecular dynamics simulations The thermal conductivity of monolayer silicene at 300 K is found to be 9 4 W/mK, which is shown to be only 20% of that of bulk silicon The contributions from in plane and out of plane vibrations to thermal conductivity are quantified, and the out of plane vibration contributes less than 10% of the overall thermal conductivity, which is different from the results of the similar studies on graphene The difference is explained by the presence of small buckling, which breaks the reflectional symmetry of the structure

29. Enhanced Electronic and Magnetic Properties of Cr and Mn Doped GeC Zinc Blende

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The electronic and magnetic properties of the doped GeC by Cr and Mn are studied using the Koringa Kohn Rostoker (KKR) method combined with the coherent potential approximation (CPA) We have determined the nature of the forbidden band gap and investigated the metallic character when the doping is made by the chromium and the manganese On the other hand, although the doping is above the percolation threshold, the total magnetic moment for Ge1 0 25TM0 25C is 0 491 and 0 67 B for Cr and Mn, respectively Besides, the polarization as well as the main responsible source of magnetism in the system is determined Finally, using the mean field theory, the Curie temperature TC is estimated for different concentrations It was found that the effect of doping with Mn had a significant impact on TC since it exceeded the room temperature The findings of this work suggest GeC based diluted magnetic semiconductors as potential materials for electronics applications

30. MONTE CARLO SIMULATIONS FOR MAGNETIC CORE SHELL MATERIALS

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Magnetic materials are relevant for a wide range of applications, particularly in biomedical therapy and heat assisted magnetic recording due to their special properties The latter must be defined and clearly defined so that we can fine tune accuracy and efficiency in each corresponding application In this case, Monte Carlo simulation was used to study the magnetic properties of the Core Shell structure, due to its powerful tool for studying thermodynamic properties

31. DFT Investigation on Structural Stability and Ferromagnetism in V doped MgTe for spintronic Sppli-cations

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Abstract Based on the first principle calculations using the KKR CPA method with the generalized gradient approximation GGA, we study the doping effect of the transition element Vanadium on the structural, electronic and magnetic properties of Magnesium Telluride MgTe The calculations show that pure MgTe is an intrinsic non magnetic semiconductor with a direct energy bandgap of 1 75-;eV The introduction of Vanadium impurities renders the doped compound half metallic with a spin polarization equal to 100% at the Fermi level The double exchange interaction is the mechanism responsible for magnetism in MgTe The total magnetic moment of the doped system varies from 0 354 B to 0 712 B for concentrations of 12% to 25% respectively, while the critical temperature increases from 124-;K to 700-;K for the same concentration values Therefore, Mg(1 x)VxTe material can be suitable for spintronic applications

32. HALF METALLIC FERROMAGNETS FOR SPIN TORQUE APPLICATIONS

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Combining both charge and spin information of electrons, spintronic devices are expected to be a good candidate to face the challenge of substituting the established semiconductor devices These devices are much faster, more efficient, and more reliable than their conventional counterparts Spin transfer torque (STT) is a key phenomenon in spintronics, which involves the transfer of spin angular momentum between two ferromagnetic layers separated by a non magnetic spacer Half metals have been proposed as promising materials for STT applications due to their unique electronic properties, which make them ideal for achieving high spin polarization and efficient spin transfer This review poster provides an overview in the use of half metals for STT applications We discuss the theoretical background of half metals and their electronic structure, as well as their potential for use in spintronic devices /MOUAD OUASTI

33. Doubles perovskites ferromagnetiques pour la haute conversion photovoltaique dans les cellules solaires: calcul ab initio

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The electronic stucture and magneto optical properties of doubles perovskites Sr2FeReO6 and Sr2CrWO6vare investitged whith and by (PBE sol, and PBEsol+ U) approximations The analysis of the electronic structure show that compound are half metallic (HM) ferromagnet (FM) with a spin polarised 100% at the Fermi level The mechanism in these systems is attributes to p d hybridization and double exchange Ziner The ferromagnetic compound is capable of absorbing 80% from the visible light Alloy will be able to be a great power source for highly effective photovoltaique conversion in solar cells

34. Synthesis and characterization of CoFe2O4 magnetic nanoparticles prepared by coprecipitation method

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In this study, CoFe2O4 nanoparticles were synthesized by the coprecipitation method The obtained nanoparticles were characterized using different techniques including X ray powder diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), transmission electron microscopy (TEM) and vibrating sample magnetometry (VSM) XRD analysis confirmed the formation of a single phase spinel with a crystallinity size of approximately 56 nm FTIR revealed the formation of octahedral and tetrahedral sites TEM and SEM analysis confirmed the morphology and nanometric nature of the prepared sample Finally, the analysis of the magnetic properties revealed a ferrimagnetic behavior at room temperature

Thematic 6

Physical Properties of Materials II

1. First Principles Study of Corundum V2O3 Material as a Promising Anode Electrode for Li/Mg/Al ion Batteries

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Rechargeable multivalent metal ion batteries have attracted the attention of researchers, owing to their great potential to meet the future demands from portable devices to large scale energy storage In this work, we study the thermodynamic, electronic, structural properties and the variation in the open circuit voltage during the insertion of Li, Mg and Al atoms into corundum V2O3 using first principles calculations

2. The effect of chalcogensdoped with dilation strain on the electronic, optic, and thermoelectric properties of perovskite BaSnO3 compound

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The effects of three axial dilation strains and chalcogens doped BaSnO3 on the physical properties of perovskite BaSnO3 compoundusing density functional theory After applying dilation strain up to 2 5% , the bandgap decreases from 3 149 eV (pure) to 2 18% (2 5% of dilation strain) Moreover, when chalcogens(S, Se, and Te) and 2 5% of three axial dilations occur in the BaSnO3 compound, the BaSnO3 becomes a semiconductor with a direct bandgap Furthermore, the bandgap decreases by increasing the concentration of chalcogens elementsup to 5 0% Furthermore, when S, Se, or Te doped BaSnO3 with the presence of 2 5% of three axial dilations, the absorption coefficient shifts into the visible region due to the reduction of bandgap which is quite recommended the photovoltaic applications the transport properties were carried out using BoltzTraP code

3. Materials for Solid Electrolytes in Solid state Battery Application

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Closo dodecaborates are considered among the potential candidates for solid state electrolyte materials due to their high ionic conductivities In this work, the electronic, vibrational and thermodynamic properties of these structures are reported using first principles calculations These structures have an insulator character with a large band gap, which makes them suitable for use as ion conductors in all solid state battery electrolytes, according to the results of their structural and electrical properties Additionally, The dynamic stability of these structures are also confirmed by phonon density of state And the molecular dynamics simulations are performed at 300K and 600K temperatures, in order to investigate the stabilities of these systems at low and high temperatures Finally,

the variation of the ionic conductivity between these structures at room temperature are explained by the calculation of the energy barrier of cation diffusion in each structures

4. Theoretical investigation of electronic, optical and thermoelectric properties of Tellurium doped barium titanate(BTO) through modified Becke johnson exchange potential

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The electronic,optical and thermoelectric properties of Tellurium doped barium titanate with various concentrations(2,7% ,4,2% and 8,3%) are investigated using the density functional theory and Boltzmann transport theory calculations based on WIEN2K and BoltzTrap code This study is carried out by applying the local density approximation(LDA) and Tran Balaha modified Becke johnson exchange potential (TB mBj) Formation energies are taken into consideration throughout the calculations to examine the stability of the doped compound Thus,the insertion of impurity can reduce significantly the electronic band gap from 2,752eV to 1,030eV, 0,953eV and 0,500eV when concentration is increased Consequently,the absorption ability is improved for tellurium doped in the visible light(380 790nm) Then , dielectric function, optical absorption coefficient, optical conductivity, optical energy gap and Urbach s parameters are predicted

5. Numerical study on the performance of a hydrogen storage tank based on metal hydride

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Solid state storage tanks based on metal hydrides have demonstrated great potentials to store hydrogen in large quantities in a quite secure, repeatedly reversible manner and thus, becoming increasingly attractive option for hydrogen applications The heat transfer to/from the metal hydride reactor bed is one of the major controlling parameters of the storage process The objective of this research is to present a 2D numerical model using Finite Volume Method and estimate the hydrogen storage performance of a cylindrical metal hydride bed for both the cases, i e powdered metal hydride bed and ENG compacts based reactor bed at different values of inlet pressure and heat transfer fluid temperature In this study, a detailed investigation on the absorption process reveals that reactor beds with compacted disks of LaNi5 and ENG demonstrate an enhanced effective thermal conductivity and efficient mass transfer

6. Etude des materiaux perovskites pour l'applications photovoltaiques

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The present study investigates the effects, of V and/or N doped CaZrO3 on the electronic and optical properties using spin polarized density functional theory calculations It was found that the obtained results of the pure CaZrO3 are in complete agreement with the experimental data Moreover, the V and N impurities decrease and transform the sizeable electronic band gap from an indirect insulator (4 964 eV for the pure CaZrO3) to a direct semiconductor (1 369 eV for CaZr0 8750V0 1250O2 9584N0 0416) Hence, the absorption coefficient of CaZr0 8750V0 1250O2 9584N0 0416 structure is enhanced in the visible region which is quite remarkable for solar cells In addition, the calculated enthalpies of formation confirm that all studied structures are thermodynamically stable A El Badraoui, S Dahbi, N Tahiri, O El Bounagui, H Ez Zahraouy

7. Enhancing the Optoelectronic Performance of Janus GeSnS2 Monolayers using Strain and Electric Field

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This study investigates the electronic properties of a single layer of the novel Janus material GeSnS2 using density functional theory By utilizing the hybrid functional HSE06 in addition to the standard PBE approximation, the study aims to obtain accurate findings about how changes in strain and electric field affect the material s electronic properties The results of the study reveal that the bandgap energy of the GeSnS2 monolayer is 2 15 eV and that it exhibits an indirect band gap behavior The study found that when strain is applied, the bandgap changes significantly Furthermore, the study discovered that the electric field has a slight effect in changing the bandgap of GeSnS2 monolayer when the electric field is changed from 0 to 8 V/nm an , and a band shift occurs under certain conditions The study provides valuable insight into the potential of GeSnS2 and opens the door for further research in this field

8. Diffusion of Lithium ion in Phosphorene in lithium ion batteries

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Since a long time the KMC has demonstrated to be a remarkable simulation tool to properly describe the physicochemical processes involved, Despite the advantages it presents, kMC has not yet been fully exploited in the field of lithium ion batteries (LIBs) and its impact in this field is increasing exponentially generally ,Diffusion coefficients in LIBs electrodes are between 10-5 and 10-18 cm2 s 1 , indicating that diffusion may have an important kinetic influence So, understanding diffusion in depth is one of the keys to improving the performance of battery materials In this work we focus in lituim ion diffusion in black phosphorene ,such asa two dimensional material that present an important alternative to the traditional anode in lithium ion batteries, by combining first principle calculations based on density functional theory with Kinetic Monte Carlo simulations

9. The Core Size Effects on the Compensation Temperature in a Ferrimagnetic Bathroom Nano System: Monte Carlo Study

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The magnetic properties of a ferrimagnetic type bathroom tile (4 8) core shell nanostructure with the mixed spins (3/2, 7/2) are studied using the Monte Carlo simulations The purpose of this paper is to investigate the impact of the core size on the magnetic properties of a core shell nanosystem We start by illustrating and discussing the ground state phase diagrams in different physical parameter planes Then, we study the thermal magnetizations and susceptibilities behaviors Furthermore, we examine the core size effect on the compensation temperature Finally, we discuss the variation of the total magnetization as a function of the crystal and external magnetic fields

10. Theoretical investigation of electronic, optical, and thermoelectric properties of cubic spinel semiconductors for energy harvesting

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The structural, electronic, optical, and thermoelectric properties of MgX2O4 (X =Sb, Bi, Rh) are studied by the Wien2K software which is based on the density functional theory (DFT) Band structure calculation by modified Becke and Johnson potential (TB mBJ) reveals MgSb2O4, and MgBi2O4 possess indirect band gaps of 1 49 eV, and 2 35 eV , while MgRh2O4 has a direct band gap of 2 7 eV However, the optical properties of MgX2O4 (X = Sb, Bi) are analyzed by the absorption, dielectric constants, absorption, refraction, refractive index, etc In addition, the thermodynamic behavior is concluded in terms of Debye temperature Finally, the thermoelectric

behavior is studied to represent the importance of the studied spinels in optoelectronic devices by calculating the figure of merit (ZT) The high values of Seebeck coefficient and ZT at room temperature show the potential of the studied spinels in thermoelectric devices

11. les proprietes physiques des perovskites halides

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A study of Perovskites halides compounds using the Density Functional Theory Method these compounds have recently become one of the research in the field of photovoltaics due to their increased conversion efficiency, tunable band gap and easy fabrication process the halid perovskite used is CsPbI3 in cubic phase and other varieties phases the electronic structure, PDOS and DOS curves are calculated using Quantum Espresso code followed by doped CsPbI3 in A, X sites

12. The Physico chemical properties of the Iron sillenite material for the photocatalysis application

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Bi25FeO40 powders were synthesized via a solid state reaction (SSR) process The structural, optical, photocatalytic, and magnetic properties were investigated using theoretical and experimental methods Moreover, thermal analysis DSC and dielectric measurements were also investigated The Studied compound exhibited an important absorption in both regions; UV and Visible light ranges, with the band gap energy of 2 38 eV That promises the application of sillenite material as a photocatalyst, and this is confirmed via the calculated photocatalytic properties The DSC thermal analysis shows the appearance of phenomena that correspond to the phase transitions of sillenite type compounds and have been confirmed by the dielectric measurement and by the X Ray Diffraction at a Hight Temperature (XRD HT)

13. Hole Phonon Coupling and Magnetic Field effect on Magneto Transport Properties of Ga1 xMnxAs in Confined Systems

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The magneto transport properties of Ga1 xMnxAs parabolic quantum dot are studied in the presence of hole hole and hole phonon interactions in the range of temperature from 0 K to 50 K and in magnetic fields varying from 5 to 5 T Calculations of energy levels of the system have been performed with a resolution of the Schrodinger's equation and all thermodynamic functions and Magneto Transport properties are derived by using the canonical ensemble Our formalism's numerical calculation is essentially applied to dilute semiconductors Ga1 x MnxAs containing 3% Mn The Ga1 xMnxAs quantum dots with 3% Mn content are ferromagnetically even in the absence of a magnetic field, and show the antiferromagnetic behaviour under certain conditions This results are similar with the majority of the previous works In addition, the persistent current of the system in the presence of magnetic fields is also investigated, taking into account the role of the hole hole interaction

14. Surface chemical modification and stability of two dimensional black phosphorus with impurities: First principles insights

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Black phosphorene is a promising two dimensional material with an anisotropic structure and unique electronic properties, making it suitable for various applications such as optoelectronic devices, field effect transistors, biomedicines, and energy devices How-

ever, due to the reactivity of the lone pair electrons of its phosphorus atoms, the material is susceptible to oxidation and degradation when exposed to air, which limits its potential application To overcome this issue, chemical functionalization is a viable solution that can enhance the ambient stability of phosphorene This talk will present a curious study of ubiquitous molecules' interactions with fluorinated phosphorene

15. materiaux perovskites pour les applications photovoltaique

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Structural, electronic, and optical properties of undoped and chalcogens doped ATiO3 (A = Ca, Ba, and Sr) materials are studied using Density Functional Theory and Local Density Approximation with modified Becke and Johnson to explore the effect of S, Se or Te doped ATiO3 perovskites Our results show that after the substitution of S, Se, or Te elements in oxygen sites, the bandgap widths are decreased with increasing the doped concentrations up to 7 5% , conserving the p type semiconductor behavior because the number of the core orbital in the pure structures are the same in the doped structures (after the substation of oxygen atoms O (2s22p6) by chalcogens' orbitals S (3s3p6), Se (4s24p6) and Te (5s25p6)) Therefore, the absorption coefficient and the optical conductivity of the doped systems are boosted in the photovoltaic range, especially for BaTiO3 doped with 2 5% and 5% of Te making BaTiO3Te more favorable for the photovoltaic devices compared to CaTiO3Te and SrTiO3Te compounds

16. Investigation of the magnetocaloric properties of LaCoO3 compound with high and intermediate spins as a promising candidate for the refrigeration magnetic application at low temperature: A theoretical study

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H Ouichou, I Hamideddine, N Tahiri*, O El Bounagui, and H Ez Zahraouy Laboratory of Condensed Matter and Interdisciplinary Sciences, Unite de Recherche Labellisee CNRST, URL CNRST 17, Faculty of Sciences, Mohammed V University of Rabat, Morocco Abstract The electronic properties of the perovskite LaCoO3 compound were studied using the first principles calculations However, the magnetic and magnetocaloric properties were calculated via Monte Carlo calculations (MCs) The MCs combined with the metropolis algorithm was implemented to investigate the magnetic properties of LaCoO3 The calculated Curie temperature value (TC) was found to be 86 K for (IS) and 50 K for (HS) The evolution of the magnetic and magnetocaloric (MEC) properties as a function of the external magnetic fields were also studied The simulated magnetic entropy and relative cooling power (RCP) lead the LaCoO3 compound to be considered a suitable candidate for refrigeration magnetic at low temperature

17. Proprietes magnetiques de sphere pleine a couches disques de spins mixtes

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Ce travail vise les proprietes magnetiques de spheres a plans A et B de spins alternes S = 1 et = 3/2 respectivement ont ete etudiees, en vue de degager des caracterisations structure - forme notamment la compensation entre les sous reseaux L'etude est realisee en utilisant la methode de simulation Monte Carlo mise en oeuvre a l'aide de l'algorithme de Metropolis pour spins classiques : Ising pour un systeme de taille finie a conditions aux bords libres Les resultats obtenus montrent que la temperature de compensation depend des valeurs de couplages utilises Les couplages sont evalues par un calcul analytique base sur la minimisation de l'energie du

systeme de spins Pour le triedre de valeurs $(J_S;\ J_S/J_S = 3,2;\ J_S/J_S = 0,5)$, la temperature de compensation est evaluees pour certaines tailles Dans ce travail, les phenomenes d'hysteresis magnetiques sont etudies et interpretes

18. Solid State Hydrogen Storage Materials

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H2 is regarded as a non polluting, abundant, efficient, and low cost energy vector for a wide range of applications, including stationary power supply and distribution, The lightest gas in nature, with a high gravimetric energy storage density andlow volumetric energy density It can be stored in 3 forms: gas, liquid, and solid, and each has distinct advantages Despite the fact that compressed hydrogen and liquefied hydrogen are mature technologies for industrial applications, appropriate measures are required to address issues at high pressures up to 100MPa and low T around 20K Storing hydrogen in solid state hydrides allows for a more compact and safer approach that does not necessitate high hydrogen pressure or cryogenic T

19. Substitution effect by selenium and tellurium elements on electronic structures, optical and thermoelectric features of FeS2: DFT + U

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The effects of selenium and tellurium substitution on structural, electronic, optical, and thermoelectric properties of FeS2 compound are investigated using the first principal calculations and Hubbard potential (U) Phonon dispersion of each structure is simulated to examine the feasibility of the synthesis and evaluate the relative stability FeS2 is an indirect semiconductor with an energy gap of 1 058 eV, and also the electronic properties can be tunedby substituting sulfur element with chalcogenide Other optical properties such as optical band gap, Urbach energy, and dielectric function in both (xx) and (zz) directions are studied The thermoelectric features forthe studied compounds are both strengthened and weakened under the temperature effect

20. Conception de nouveaux materiaux supraconducteurs: Composes a base de CuO2 en multicouches et systemes bidimensionnels a base de phosphorene

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Blue phosphorene is an interesting two dimensional (2D) material, which has attracted the attention of researchers, due to its affluent physical and chemical properties In recent years, it was discovered that the intercalation of alkali metals and alkaline earth metals in 2D materials may lead to conventional Bardeen-Cooper-Schrieffer (BCS) superconductivity In this work, the electronic structure, phonon dispersion, Eliashberg spectral function, electron-phonon coupling (EPC), and the critical temperature of blue phosphorene bilayer intercalated by alkali metals (Li, and K) and alkaline earth metals (Ca, and Sr) for both AB and AC stacking orders are studied using the density functional theory and the density functional perturbation theory, within the generalized gradient approximation with van der Waals correction

21. Functionalized Graphene Surfaces for Selective Gas Sensing

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The ability to effectively eliminate pollutants in different environments has been one of the major challenges for scientists in recent years In this respect, gas sensors have

so far been developed on the basis of intuition and experience Significant attention has been given to the finding of new material processing methods and new sensor materials for gas detection In our work, toxic gases were used in conjunction with fluorographene according to first principle calculations The adsorption performance on fluorographene for some toxic gases was examined from several aspects, such as adsorption structures, adsorption energy, electron density and band structure The analysis revealed that fluorographene exhibits good adsorption performance for some toxic molecules

Thematic 7

Mechanical Energy

1. Comparative study uses of hardwoods and softwoods in construction

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Le bois est un materiau de construction-tres ancien sa disponibilite,son cout, sa durabilite et son apparencelui rend un materiau de construction tres convoite et nous donne la difference des produits d ingenierie a base des resineux et ceux a base des feuillus pour faire une etude comparative sur l utilisation des bois des resineux et des feuillus, il est indispensable de connaitre leur proprietes mecaniques,thermique et physiques telles que la resistance,la rigidite,la densite,la teneur en humidite ,le retrait et le gonflement Dans notre etude nous allons s interesser aux proprietesmecaniques des feuillus: chene, chataignier, hetre) et les resineux (pin,le sapin et le meleze ou l epicia) et discutez leur integration dans le batiment et leur impact environnemental

2. Gypsum Bio Blocks Based on Palm Fibers to Replace Conventional Insulation Materials for Building insulation

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Gypsum bio blocks are sustainable type of building insulation that use palm fibers as a renewable and biodegradable filler The main objective of this study was to investigate the effect of different palm fiber volume fractions on the performance of gypsum bio blocks The experimental design consisted of five different mixtures of gypsum and palm fibers he gypsum bio blocks were evaluated for their density, flexural strength, modulus of elasticity, porosity, water absorption, and sound absorption The results showed that increasing the palm fiber content reduced the density and increased the porosity and water absorption of the gypsum bio blocks The flexural strength and modulus of elasticity also decreased slightly with increasing palm fiber content, but they were still within acceptable ranges for insulation applications The sound insulation values of the gypsum bio blocks improved significantly with increasing palm fiber content, indicating their potential for noise reduction

3. Semiconductor Applications

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As technology advanced these days, computers are playing a more and more important role in our daily life; especially in those areas that requires higher technology, for example, aerospace And as computers keep developing, they tend to be smaller and lighter but much more sufficient It is the base stone of modern information era However, as the width of the semiconductor area, the experience turns out pretty complicated to explain, one explanation can leads to more This

project will be talking about the main types of semiconductors, especially the most widely used ones, for example, silicone A model of streetlight which is photosensitive is constructed in this project As mentioned previously, semiconductors are the back bone of modern information era, they play the most important role in our highest technology and will be leading us to the next level of knowledge

4. Phase Change Materials (PCMs) incorporation into Construction Materials: A Comprehensive Review

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Energy consumption in building sector has been increasing in recent decades, reaching approximately one third of the total energy consumed One of the critical ways to manage and reduce this huge energy consumed is the integration of new technologies and systems to store the energy Phase change materials are capable of absorbing, storing, and releasing large amounts of thermal energy during phase transitions, they are being increasingly used to improve the thermal performance of building materials This present review highlights the different types of PCMs could be used in the construction materials Moreover, it examines recent studies that have investigated the effect of PCM incorporation on the thermal properties such as thermal conductivity, specific heat capacity, and thermal storage capacity of the building materials Finally, it presents PCM advantages and disadvantages, as well as the need for further research to enhance their use in the building sector

5. Assessing the impact of varying cement quantities on the thermal conductivity of compressed earth blocks (CEBs) with different thermal parameters

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The compressed earth block technique was developed as a low cost construction alternative to adobe and has several advantages It combines the benefits of both rammed earth and adobe, and its unique moisture regulating and heat accumulating properties are preserved because it is not fired During wet weather, the wall absorbs moisture and releases it when the air is dry CEBs are made by compressing earth, and their physical and mechanical properties can be enhanced by adding a binder, typically Portland cement, before compression (the stabilization process) This study aims to investigate the impact of heating power on the temperature and thermal conductivity of CEB samples with 4% and 7% cement in a dry state The experimental results were obtained using the hot ring method to determine thermal conductivity and revealed a significant correlation between thermal conductivity, temperature, cement content, and heating power

6. Optimizing Mechanical Properties of Stabilized Compressed Earth Blocks: Exploring the Relationship between Grain Size and Chemical Composition of Cement and Clay

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The properties of soil based materials are significantly influenced by particle size, grain distribution, and chemical composition This study examines the effect of coupling grain size of soil and chemical composition of cement and clay on the mechanical properties of Stabilized Compressed Earth Blocks (CEBs) The results show that compressive strength increases with the increase of the clay gravel ratio of non stabilized soil and the increase of cement content in all soils However, the rate of increase of clayey soil stabilized with a small amount of cement is greater if the ratio of gravel sand decreases, particularly if the soil contains a large amount of quartz and aluminate Conversely, for small clay content, the soil requires a large amount of cement to be stabilized, especially if the ratio of clay gravel and clay sand increases These

findings suggest that a careful consideration of soil properties and chemical composition is necessary for the optimal production of CEBs

7. Synthesis and Characteristics of CuO thin films for photovoltaic application

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Photovoltaic limited efficiency and the high cost of silicon solar cells are key issues for the solar cell to become an alternative to the use of readily available fossil fuels Therefore, the development of new cost effective and non toxic photovoltaic materials and energy efficient processes is essential Transition metal oxides have great potential to fulfill these requirements Among them, Cupric oxide (CuO) It has a potential alternative to silicon due to its non toxicity and simple low cost fabrication process from abundantly available materials CuO has a direct band gap energy and a relatively high absorption coefficient in the visible region In this work, we deposited CuO thin films by using the spray ultrasonic technique and investigated their structural, electrical, and optical properties

8. Production of packaging material using high density polyethylene and lignin argan shells for Vitamin C drug

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Sustainable packaging materials are vital for the production of many pharmacological compositions To explore their possible use as packaging for vitamin C, the present study developed biocomposites using high density polyethylene (HDPE) as a matrix and lignin extracted from argan nut shells as reinforcement This later was recovered via alkali and klason methods and the impacts of the extraction process and the lignin amount on the morphological, thermal, mechanical, and antioxidant characteristics of the resulting composites were examined The packing material that performed effectively with regard to pH, color stability and mechanical properties was the HDPE/alkali lignin composite When compared to raw HDPE, vitamin C drug packaged with this composite displayed a lower oxidation rate which make it a potential substance for the packaging of vitamin C

9. Morphological, Physical Mechanical, and Rheological Properties of Composites and Hybrids based on Polyethylene Reinforced by Kaolinite Particles and Ground Tire Rubber (GTR)

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This study aims to evaluate the effects of kaolinite particles and ground tire rubber (GTR) and their content on the morphological, physical, mechanical, and rheological performance of composites and hybrids based on high density polyethylene (HDPE) The mixtures are prepared in the melt by compounding in a counter rotating twin screw extruder, then injection molding to produce specimens at different concentrations (0, 5, 10, 15,20, 15:5, 10:10, and 5:15 wt %) The structural properties of the particles are analyzed by Fourier transform infrared spectroscopy (FTIR), while the morphology of the samples is determined by scanning electron microscopy (SEM) The physical, mechanical, and rheological properties of the samples are characterized in terms of hardness, density, tensile, dynamical mechanical analysis (DMA), and melt flow index (MFI) Finally, physical models such as Voigt, Reuss, and Tsai Pagano have been used to predict the mechanical properties of composite and hybrid materials

10. Synthesis and characterisation of multiferroic $Bi_(1x)\ TR_xFeO_3$ systems (TR=Eu,Nd,Gd ;0 20)

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Multiferroic $Bi_(1x)\ TR_xFeO_3$ systems (TR=Eu,Nd,Gd ;0 20) were synthesized using the sol gel method XRD showed that all samples were pure When the substitution rates of Eu, Nd, and Gd reached 20% , 15% , and 10% , respectively, all systems exhibited a structural transition from the a phase to the phase Furthermore, the BGFO system shows a second structural transition from the phase to the phase when x0 15 The observed phase transitions are accompanied by magnetic and/or electric transitions However, dielectric measurements and thermal analysis by (DTA) and (DSC) confirmed those transitions Magnetic measurements showed different magnetic properties in our systems The BEFO system showed that substitution eliminates the contribution of the weak ferromagnetic On the other hand, the BNFO and BGFO systems showed that substitution strengthens the weak ferromagnetic order The study of the nonlinear optical properties of the BEFO system has been performed

11. COMPARATIVE APPROACH IN THE DIMENSIONING AND THE THEORETICAL AND NUMERICAL STUDY OF COMPOSITE BEAMS, STEEL CONCRETE AND STEEL WOOD (CLT FLOOR)

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This theoretical study aims to study to what extent composite beams combining a steel profile and a cross laminated timber (CLT) floor are convenient This construction technique is inspired by the traditional- composite beams which use a steel section and a concrete slab If we manage to use this technique by replacing the concrete with a product derived from wood, we can then expect a better ecological balance, a reduction in the weight of the structure, more prefabrication and the possibility of dismantling / reusing the structure The ultimate goal is to be able to compare a traditional mixed steel/concrete floor with a steel/CLT floor and see if this new way of building a floor can really succeed Recent research has been conducted on possible connections between steel profiles and CLT panels to examine their potentials in composite construction Based on the aforementioned statements, I therefore present the main conclusions that have been drawn

12. Investigating the impact of crushed sand sourced from the Marrakech region of Morocco on the durability of compressed earth concrete (CEC)

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Ecological construction materials such as earth concrete containing a proportion of various ecological components are of great importance today The aim of the production of such a concrete is to reduce the consumption of cement and hence the reduction of CO2 emissions This work studies the effect of crushed sand on the thermomechanical properties of compressed and stabilized earth concretes, from the point of view of mass loss, compressive strength and thermal conductivity In this context, four sand contents were used (0% , 20% , 50% , 70%) by weight of the dry mix, with 10% cement to stabilize it The results indicate that there is an improvement in the thermomechanical properties of (CEC) for a sand rate of 20%

13. modelisation numerique de la pollution atmospherique au niveau de la surface libre

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The objective of the present work is numerical and theoretical modeling of the atmospheric pollution at the level of free surfaces (air and water), by studying tools for numerical simulation making it possible to very precisely determine the fields of concentration in

terms to space and of time

The modeling of hydrodynamic phenomena and the dispersion of pollutants is indeed an essential method for understanding the propagation of pollutants in the environment Numerical methods, such as the finite difference method, make it possible to solve these complex equations to determine the concentrations of pollutants in the environment

Using these models, it is possible to predict the spread of pollution in different situations, test what if scenarios and design strategies to reduce pollution risks This approach can be applied to a variety of industrial applications, such as emission dispersion modeling in factories, hazardous waste storage sites, or oil and gas facilities

14. Thermal conductivity of concrete

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The thermal conductivity, represented by the k value, of cement based materials, particularly concrete, is a crucial parameter to be taken into account in evaluating the amount of heat transfer through conduction The extent of heat loss through the walls and roofs directly impacts the energy consumption of buildings Two fundamental techniques are identified for measuring thermal conductivity, namely steady state and transient methods Factors such as moisture content, temperature, type of aggregate, type of cementitious material, and density of concrete play a pivotal role in influencing the thermal conductivity The present study aims to critically review the prevalent techniques used for measuring thermal conductivity in concrete and to analyze the factors that contribute to the thermal conductivity of cement based materials

15. INFLUENCE OF THE SIZE AND AMOUNT OF CORK PARTICLES AND LIME ON THE MECHANICAL AND THERMAL CHARACTERIZATION OF SOIL BASED COMPRESSED EARTH BLOCKS (CEB) FROM MARRAKECH SAFI REGION IN MOROCCO

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The principal objective of this research is to determine the influence of the size and amount of cork particles and quicklime on the mechanical and thermal characterization of soil based compressed earth blocks (CEB) from Marrakech Safi region in Morocco For this purpose, four cork aggregate sizes are used: These are the granular classes lt;0 5, 0 5/3,3/6 and 6/10 mm The results obtained reveal the remarkable benefits of cork in reducing the weight of Compressed earth blocks (CEB) and improving its thermal performance However, a decrease in mechanical strength was observed with an increasing dosage of lightweight aggregates for all four aggregate size classes The thermal conductivity varies inversely with the size of the aggregates, it is the same for the mechanical characteristics

16. Assessing the feasibility of improving Plastic Fibre (polypropylene fibers) to increase the strength and deformability of compressed earth blocks for use in building

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This paper highlights the salient observations from a systematic investigation on the effect of embedded fibre from plastic waste on the performance of stabilised mud blocks This research investigated the potential of addressing some of the shortcomings of earthen construction materials by assessing the influence of polypropylene fibers on the strength, ductility, and deformability of CEBs It was discovered that the amount of fibers present affected the deformability, post crack reponse, and block strength According to the research results in this study, polypropylene fibers are a viable fiber choice for CEB manufacture

17. Earthen blocks reinforced with Coconut fiber A review

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Earthen materials have been used for thousands of years due to their ready availability and affordability Recently, earthen materials have gained importance as the whole world has recognized the need for sustainable development in all aspects of life It is mainly used for its durability and low environmental impact To keep up with traditional building materials, natural fibers are incorporated into earthen materials to increase performance in terms of strength and durability This study presents a comprehensive review of studies involving earthen blocks with coconut fiber to increase the performance of the block Studies done with earthen blocks reinforced with coconut fiber were reviewed with a brief summary of their physical, chemical, and mechanical properties Literature searches were conducted using Google Scholar and the Web of Science Libraries

18. Perovksite solar cells

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Lead halide PSCs have emerged as a promising PV technology The core of our project is to fabricate efficient and stable perovskite solar cells with the n i p structure Our approach is based on introducing an ultra thin passivation layer (Organic halide salt) on the perovskite/Spiro interface We had a champion device with a high efficiency of 20 85% , good open circuit voltage 1 12 V which refer to the small non radiative recombination losses, good current 24 5 mA and promising fill factor of 76% For the passivation layer, further optimization is required

19. Characterization and study of the effect of incorporation of natural agricultural residues on the thermophysical properties of building materials

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Composite materials are widely used today in a variety of applications in many fields of engineering The building sector is a large consumer of resources (materials and energy), highly polluting , and a generator of waste Thus, new approaches to energy efficient design are the development and use of natural and local building materials In this way, good insulation with natural materials becomes the key tool in the design and construction of energy efficient buildings using green materials In this context, several types of plant materials (hemp, straw, flax,) have been used as fillers by mixing them with other compounds (cement, clay, sand,) to make composite materials The objective of this work is to promote the use of natural agricultural waste in construction and thus participate in the socio economic development of the local population and the launch of the marketing of new biomaterials

20. "Analysis of Structural, Vibrational, and Electronic Properties of Double Perovskite La2XMnO6 (for x=Zn2+/Co2+/Ni2+) Powders: Synthesis and Study Using X Ray Diffraction and Infrared Spectroscopy Based on Chemical Composition Effects"

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Double perovskite oxides with varying A or B sublattice ions have garnered significant attention due to their interesting properties, such as multiferroic behavior, colossal magnetoresistance effect, and oxygen ion transport/storage proper-

ties for solid oxide fuel cells and water splitting catalysis In this study, we examine the effects of chemical composition on the structural, vibrational, and electronic properties of double perovskite 3d based manganese oxides (La2XMnO6 powder for x=Zn2+/Co2+/Ni2+), prepared via high temperature solid state chemistry The crystals exhibit a monoclinic structure with space group P21/n, where Zn2+, Co2+, Ni2+, and Mn4+ ions are placed at Wyckoff positions 2b (0, 0, 1/2) and 2a (0, 0, 0), respectively, while La3+ and O2 atoms occupy different positions 4e (x, y, z) As we replace Ni2+ with Co2+ and Zn2+, the cell parameters increase gradually due to the ionic radius of Ni2+ (0 69 ;) being smaller than that of Co2+ (0 74) and Zn2+ (0 745)

21. Caracterisation thermo physique d'un materiau composite a base de ciment destine a la construction efficace

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La conception des materiaux efficaces energetiquement a pour but de doter le batiment d'une performance energetique considerable en respectant les normes de securite et en favorisant un meilleur confort thermique Le present travail consiste en la conception et la caracterisation d'un nouveau materiau destine a la construction efficace Le composite obtenu, sera forme a la base d'un materiau usuel en addition d'un materiau industriel recycle (Ciment + plastique) Ce dernier est caracterise chimiquement et thermiquement, dans de differentes temperatures Les resultats trouves pour ce nouveau composite montrent une amelioration de sa performance thermique en fonction du taux de presence du plastique L ajout du plastique recycle au materiau initial fait diminuer la conductivite thermique du composite au fur et a mesure que le taux du plastique recycle augmente, ce qui permettra de faire naitre une nouvelle maniere d'integrer l'isolation des batiments

Thematic 8

Renewable Energy and Storage

1. Electronic and optical properties of a 2D MXene monolayer called Sc2CT2 (T = F, P, Cl, Se, Br)

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MXenes are regarded as highly promising materials for a broad range of Their remarkable properties, which include high electrical conductivity, outstanding mechanical strength, significant surface area, adjustable surface chemistry, and excellent thermal stability, make them attractive for use in various fields, such as energy storage devices like batteries and supercapacitors, catalysis, sensing, water treatment, and biomedical applications

All the calculations were performed in the framework of density functional theory (DFT) using full potential augmented plane waves (FP LAPW) as implemented in WIEN2k code of the density of states (DOS) and band structures ofSc2CT2 (T = F, P, Cl, Se, Br) monolayers and optical properties were calculated, this informations can provide a useful theoretical basis for further experimental work, including guiding experimental design and optimization and identifying promising candidates for further investigation

2. Etude comparative d un systeme solaire passif et actif d une serre agricole

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L' experience se concentre sur l'evaluation des performances du systeme de chauffage solaire pour ameliorer le microclimat de la serre pendant la periode froide Ce systeme a ete teste dans une petite serre agricole afin d'ameliorer les differents parametres operationnels Les resultats de cette etude comparative entre le systeme solaire passif et actif ont montre un gain en temperature significatif Cette amelioration de la temperature va creer un climat plus favorable pour les cultures et par la suite un effet positif sur leur developpement, leur qualite et leur production

3. Calculated properties of GdNi intermetallic compound for the nitrogen liquefaction process: Insight into Ab initio Computations and Monte Carlo Simulation

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Rare Earth based intermetallic compounds display a lot of attracting aspects for their potential in cryogenic cooling applications So, a good understanding of their properties may enable the better development of the best performing magnetic refrigeration prototypes based on them To contribute in this regard, the theoretical study on the ground state proprieties of GdNi intermetallic compound and its magnetic observable

curves, as well as its magneto caloric effect (MCE) has been performed by two methods: DFT study and Monte Carlo simulations Besides, S_{mag}^{Max} (the maximum value of $S_{mag}(T)$) and RCP (Relative Cooling Power) attain maximum values of 17,13 JKg 1K1and 549 Jkg 1close to T_c, respectively for external magnetic field of 5T, being in good agreement with the experimental ones The present findings enable us to say that GdNi based magnetic refrigeration can be considered as a promising technology for the nitrogen liquefaction process

4. Enlighten some photophysical analysis for CsPbBr3:Li perovskite films M Battas1, L Atourki1, M Abd lefdil1, M Regragui1 1 MANAPSE Lab, Faculty of Science - Mohammed V University in Rabat, Morocco

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In this contribution, Li doped CsPbBr3 thin films have been investigated through structural and optical analysis Then, deep defects trap states and solar cell performances were simulated by SCAPS 1D The X ray diffraction patterns display an orthorhombic structure, with (220) orientation FESEM images exhibit a crystalline agglomerate with doping The photophysical properties and recombination mechanism were investigated by temperature and power dependance on photoluminescence It was found that lithium doping improves optical phonons coupling, in addition to defects reduction and surface passivation From SCAPS simulation, the doped films result in a better power conversion efficiency, ranging from 6 7% to 8 21% These results aim for a better understanding of non radiative recombination mechanisms, a binding element of the solar cell efficiency, and the opto electronic devices performances

5. Transition Metal Dichalcogenide Heterostructures as High Performance Anode Materials for Lithium and Sodium Ion Batteries

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Recent advancements in battery technology have emphasized the need for novel anode materials to improve the performance and capacity of ion batteries Researchers are exploring the potential of advanced 2D materials, specifically transition metal dichalcogenides (TMDs) heterostructures, as anode materials for ion batteries These materials have a high surface area, good electrical conductivity, and tunable properties that make them attractive for battery technology While there is a growing research interest in this field, further work is required to fully understand the performance and potential of these TMD heterostructures Successful research could lead to the development of more efficient and practical ion batteries with a broad range of potential applications

6. Doping effect on the electrochemical properties of titanium based phosphite anode for Lithium ion batteries

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Phosphorous based materials have been intensively explored as potential electrode materials in Li ion batteries due to their vast 3D open framework, low cost, and safety Titanium containing phosphite, LiTi(HPO3)2, is a promising composition that showed great electrochemical stability but its specific capacity is limited In this study, an approach of elemental doping was employed to surpass this drawback The effect of doping is regarded as a viable option to increase the capacity and electrical conductivity, which will

contribute to the improvement of the electrochemical properties The pristine and doped phosphite materials were synthesized by hydrothermal route, and characterized by XRD, TGA, and SEM, to study their structural, thermal, and morphological properties, respectively Electrochemical tests such as GCPL, CV, and EIS, were conducted to evaluate their performances, in terms of capacity and cycle life

7. Improving the energy efficiency of buildings through the application of artificial intelligence

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Climate change has emerged as a major challenge for society in the 21st century Rising temperatures are a potential threat to ecosystems, but also to humans They directly affect the thermal behavior of buildings, increasing energy consumption to maintain the thermal comfort of its users Energy efficiency is now recognized as one of the fastest and most appropriate approaches to reduce energy consumption related to greenhouse gas emissions and to make building design more developed and sustainable This approach requires the presentation of all the techniques, methods, solutions and ways of thinking that focus on improving the energy performance of buildings The aim of our work is to study the impact of the integration of an intelligent system for the management of energy consumption (thermal and electrical) of a residence and to compare these results with those obtained in the case of the use of passive energy efficiency methods

8. study of the magnetic and magneto caloric properties of GdH2 and TbH2

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Using Density Functional Theory (DFT), the electronic structure, density of states, band structure of the GdH2 and TbH2 compund were investigated The magnetic and magnetocaloric properties of this materials were studied using Monte Carlo (MC) simulation in an Ising model We calculated the isothermal magnetic entropy change The adiabatic temperature change and the relative cooling power (RCP) for different external magnetic fields and temperatures This GdH2 and TbH2 materials exhibits interesting magnetic and magnetocaloric properties at low temperature 21 5K and 16 7K for GdH2 and TbH2 respectively, in the bulk case Finally, the propect of thin layers of this materials gives us an optimistic view of their interest Abdelghani BENSASSI

9. Hydrogen Storage Properties of Magnesium Hydride MgH2 by ab initio Calculations

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The aim of this work is the improvement of the desorption temperature and kinetic properties in MgH2 From a doping by percentages of transition metal we find that the formation energy increases with the increasing transition metal (Ti)concentration and, vice versa, for the desorption temperature in MgH2 but the major problem metal (Ti), In particular, , with this technique than the gravimetric capacity of MgH2 reducedfrom 7 66 to 7 02 wt% when the concentrations of transition metal (Ti) ,increase from 0 to 10% that s for this reason we havetry another method, we inspect the effect of magnesium vacancies and hydrogen doping on the magnesium hydride (MgH2) we find that the gravimetric capacity of MgH2 increases from 7 658 to 8 62 wt% when the concentrations of magnesium vacancies and hydrogen dopant atoms increase from 0 to 10%

10. synthese des materiaux phosphate et l utiliser dans le domaine de stockage

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Cette approche est basee sur l'electrodeposition des materiaux a base de l'oxyde de Mn dans un milieu phosphorique en utilisant des conditions de potentiels, pH, temperature et concentration adequates et bien determinees A l'aide des differentes techniques de la caracterisation, nous avons reussi a determiner la structure et la composition de ce materiau L'etude electrochimique de ce materiau a revele une bonne stabilite (duree de vie importante) et une bonne capacite de stockage

11. : Study of the Magnetic and Magnetocaloric Properties of the Mn3XC(x=Ge) anti perovskite Compound

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We report first principles calculations on the electronic, magnetic, and magnetocaloric properties of the perovskite metal compound Mn3GeC We have studied this compound using a combination of density functional theory calculations (DFT) and Monte Carlo methods The metallic perovskite Mn3GeC materials have a secondary ferromagnetic paramagnetic transition around Tc = 330 K Our calculations show that this compound is more stable in the equilibrium state of the ferromagnetic network, estimated in agreement with the experimental parameter The results of the simulation reveal that the Mn3GeC structure behaving of metallic character; using calculations of first principles, the magnetic and magnetocaloric properties have been calculated

12. DFT Analysis of Halide Substituted K2AgSbX6 Double Perovskite for Solar Cells Applications

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Perovskite materials have recently attracted the attention of researchers, especially inthe field of solar energy, due to the high efficiency achieved by solar cells based on these materials and the low production costs A primordial step to understanding the behavior of perovskite solar cells (PCSs) under solar irradiation is to determine the different properties of the material In this context, the present work reports a DFT study of structural, mechanical, electrical, optical, and thermoelectric properties of the double perovskite K2AgSbX6 (X= Cl, Br) The properties of the double perovskite crystal structure were studied using the Full Potential Linearized Augmented Plane Wave (FP LAPW), which is based on DFT The results show that the material is mechanically stable and had an indirect electronic bandgap of 2 30 eV and 1 52 eV The material also exhibited good thermoelectric properties, making it suitable for solar cells and thermal devices

13. Comparative study with performance testing of photovoltaic technologies in different installation locations

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Ma these s intitule "Etude comparative avec tests de performance des systemes photovoltaiques dans divers lieux d installation" Mon etude de these est axee sur trois objectifs principaux Pour evaluer les performances energetiques, financieres et environnementales de trois systemes solaires (monocristallin, polycristallin et amorphe), les parametres de performance de chaque systeme sont d abord calcules Les trois systemes photovoltaiques sont compares sur le deuxieme axe pour determiner lequel est le meilleur pour chaque site La performance d un hybride thermique photovoltaique est l objet le plus recent de mon sujet de these, sur lequel je fais actuellement des recherches pour determiner comment nous pourrions utiliser la temperature PV defavorable pour augmenter l efficacite des panneaux PV

14. Mixed renewable energies

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In this topic, we are trying to design a program that simulates mixed renewable energies and finds the best combination of them in a specific area, through the geographic and climatic data that we provide to the program

15. Voie de synthese d'un film mince MnPO4 H2O et sa caracterisation en tant que materiau Pseudo capacitif

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Ce travail presente la synthese a basse temperature de film mince de MnPO4 H2O en utilisant la methode d electrodeposition L oxydation electrochimique du manganese (ions manganese II) dans l acide phosphorique sur l electrode de platine (Pt) a ete etudiee en appliquant la voltamperometrie cyclique (CV) Les resultats indiquent que l electrodeposition d un film mince de MnPO4 H2O necessite l oxydation simultanee des ions manganeux Mn2+ et de l eau a la surface de l electrode Les performances electrochimiques des films obtenus ont ete etudiees par voltamperometrie cyclique (CV) et par des methodes de charge decharge galvanostatique (GCD) en utilisant differents electrolytes Les resultats electrochimiques indiquent que le film mince de MnPO4 H2O a une capacite specifique elevee

16. Study by numerical simulation of the solar cell based on SnS by SCAPS

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This study presents an analysis of the photovoltaic characteristics of SnS based solar cell devices, a promising material for solar cell applications The Solar Cell Capacitance Simulator (SCAPS) software was used to simulate the performance of the solar cell SnS, an abundant and non toxic material, was used as the absorption layer and CdS as the buffer layer in the studied solar cell structure, which is a glass/ITO/ZnO/CdS/SnS/metal contact The performance of the solar cell was studied by varying the thickness of the absorption and buffer layers The operating temperature was also modified for three different window layer thicknesses to determine its impact on the performance of the solar cell The results show that the efficiency of the solar cell increases with increasing thickness of the absorber and buffer layer up to a certain limit, and then saturates

17. contribution a la renovation energetique des batiment

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L amelioration de l efficacite energetique est une mesure qui est devenue necessaire pour les secteurs energivores, en particulier le secteur du batiment L introduction de materiaux a changement de phase (MCPs) est l une des solutions passives qui peuvent etre appliquees au niveau de l enveloppe pour remedier a cette problematique Le choix de leur temperature de fusion est un parametre cle a prendre en consideration, puisqu il permet de realiser des economies d energie potentielles Dans notre article est elabore, en contribuant par la presentation d une methode basee sur l optimisation multi objective pour optimiser le stockage de l energie latente dans les batiments Les resultats montrent que l utilisation de MCPs avec une temperature de fusion bien definie peut conduire a des economies d energie allant jusqu a 15% dans les climats tropicaux Le flux de travail examines se sont averes appropries pour explorer differentes alternatives de conception pour l enveloppe du batiment

18. Green hydrogen production technologies through seawater electrolysis powered by renewable energy

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Green hydrogen (H2) as a sustainable energy carrier can be directly produced through water electrolysis, potentially replacing traditional fossil fuels to achieve carbon neutrality Current water electrolysis technologies rely on ultrapure freshwater, which is scarce (less than 1% of the earth's water) and unevenly distributed worldwide Due to the abundant reserves and good economic feasibility, the conversion of seawater to H2 powered by renewable electricity is considered a promising candidate for energy sustainability This article will examine the different electrolysis technologies studied to produce seawater hydrogen There are several technologies at various stages of maturity, including proton exchange membranes (PEM), alkaline water, anion exchange membranes, and solid oxide electrolysis

19. Impact d un systeme solaire durable sur la croissance des plants de fraises dans une serre agricole

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Cette etude porte sur l utilisation d un systeme solaire automatique dans une serre agricole orientee nord sud pour ameliorer le developpement des plants de fraises en hiver Le systeme utilise la circulation de l eau comme fluide caloporteur pour stocker la chaleur pendant la journee et la restituer a la structure pendant la nuit Une etude experimentale comparative a ete menee dans deux serres, l une equipee du systeme de chauffage solaire et l autre sans systeme de chauffage Les conditions climatiques dans la serre experimentale ont ete controlees automatiquement grace a l integration de l internet des objets dans le systeme Le systeme peu couteux et ecologique a permis de chauffer la serre pendant l hiver et d ameliorer le microclimat de la serre, ce qui a permis de precocite la production de 17 jours par rapport a la serre temoin La visualisation et l analyse des donnees en temps reel peuvent etre effectuees via un site web grace a l integrations de l internet des objets

20. Optimizing Daylighting Strategies: A Comparison of Active and Passive Technologies for Energy Efficiency and Occupant Comfort

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The International Energy Agency has estimated that lighting accounts for nearly 20% of the world s electricity consumption, underscoring the need to explore new technologies that leverage sunlight and incorporate daylighting systems into buildings This approach offers an economically viable and environmentally friendly solution Developing prototypes for daylighting systems can enhance their efficiency This study examines existing daylighting technologies, including passive systems with stationary designs and active systems with sun tracking features The review indicates that active systems with solar tracking remain a popular choice However, further research is necessary to improve the affordability, eco friendliness, and ease of installation of daylighting systems for optimal implementation in buildings

21. Novel Black Phosphorus Based Anode Strategies for High Performance Sodium Ion Batteries

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This work proposes novel black phosphorus based anode strategies for high performance sodium ion batteries We highlight the key advantages of black phosphorus as an anode material, including its high theoretical

capacity and excellent electronic conductivity We also discuss the challenges associated with using black phosphorus in batteries and propose several approaches to mitigate these challenges Overall, We provide valuable insights into the development of high performance sodium ion batteries using black phosphorus based anodes

22. Study, design and construction of an indirect drying solar dryer with a single compartment

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The dryer presented in this paper is made in the solar energy and environment laboratory of the Faculty of Sciences of Rabat (LESE) Our objective consists in the determination of the optimal geometry of this drying box, by the evaluation then the optimization of the average daily and annual solar irradiation received by m of cover of the box, led us to the choices of the orientations and the inclinations of the facades and the determination of the optimal shape of this box After the experimental tests and the comparison between the result of this new model of dryers and the ordinary indirect solar dryers, we conclude that our dryer meets the criteria and standards to be considered as an alternative to positive dryers, and at the level of economic cost, this new design of the solar dryer is less expensive than conventional two compartment solar dryers, which is beneficial and encourages its use by the local producer

23. Calculated properties of GdNi intermetallic compound for the nitrogen liquefaction process: Insight into Ab initio Computations and Monte Carlo Simulation

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Rare Earth based intermetallic compounds display a lot of attracting aspects for their potential in cryogenic cooling applications Therefore, a good understanding of their properties may enable the better development of the best performing magnetic refrigeration prototypes based on them To contribute in this regard, the theoretical study on the ground state proprieties of GdNi intermetallic compound and its magnetic observable curves, as well as its magneto caloric effect (MCE) has been performed by two methods: DFT study and Monte Carlo simulations; The present findings enable us to say that Manuscript File Click here to view linked References GdNi based magnetic refrigeration can be considered as a promising technology for the nitrogen liquefaction process

24. The Effect Of Rear Earth Doping Srsno3 On Structural And Optical proprieties: DFT Study

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The full potential linearized augmented plane wave orbital (FP LAPW) method as implemented in the Wien2K code The electronic properties calculated using the TB mBJ (Tran Blaha modified Becke Johnson) approximation occurred in an indirect band gap of 3 97 eV, which is consistent with experimental results (4 1 eV) The incorporation of rare earth RE into SrSnO3 produces new sates at Brillouin zone symmetry points, which tends to reduce the electronic band gap This leads to significant interactions between RE atoms and their neighbors in comparison to Sr atoms and their surroundings Moreover, the optical properties of SrSnO3 change considerably with RE doping in accordance with the electronic band structure The fundamental improvements in the electronic structure and optical properties of SrSnO3 doped with RE open up new avenues for potential optoelectronic applications

25. First principle study of the electronic, structural, optical properties of CuI and doped CuI

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We will investigate the structural,optical and electronic properties of CuI and doped CuIusing density functional theory We study the p type semiconductor CuI as possible alternative to SPIRO Ometad in perovskite solar cells, as its costly effective and has been shown to be capable of high efficiency The effect of copper and iodide vacancy (i e , intrinsic p type doping), and copper substitution (extrinsic p type doping)will be studied bycomparing their properties with pristine CuI to find the best p type semiconductor for PSC application

26. Effect of orientation of the cation CH3NH3 on exciton's mobility in CH3NH3PbI3

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We investigated the effect of the orientation of the cation MA (i e , CH3NH3) on exciton's mobility in the hybrid material MAPbI3 using the density functional theory We calculated the effect of such an orientation on the lattice parameters, band structure, density of states, and electric conductivity The latter was calculated using the Boltzmann transport equation in the relaxation time approximation as a function of the chemical potential It is compared with the conductivity of the centrosymmetric material CsPbI3 to highlight the role played by MA in MAPbI3 Particularly, the conductivity in the latter is anisotropic, showing a pronounced enhancement along the direction of the dipolar moment of MA Applications could take advantage of this result if they are made in a polarized phase Our findings agree with experimental data for MAPbI3 under the effect of an external electric field

27. Operation Of Connected Homes With Photovoltaic Battery Energy Storage Systems And The Role Of These Systems In Preserving The Environment

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Renewable energies from residential photovoltaic systems can be used in the electricity sector as well as in the residential heating sector, due to the fluctuation and intermittency of distributed PV generation, battery energy storage is required with higher renewable installation towards carbon neutrality, where considered solar photovoltaics and batteries are key technologies to enable a rapid decarbonization of electricity systems

And PV battery systems provide the opportunity to store solar energy that is not locally consumed during the day and make it available for self consumption in the evening

Also, the dimensioning of the different system components heavily influences the economics of the home, where components, such as photovoltaic generators, battery storage systems, heat pumps, and thermal storage units, play a major role for the profitability economic

28. Monte Carlo Study of Magnetic properties and thermal behavior of the monolayer Rubrene like nano island

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The magnetic properties of a mixed Rubrene like nano island have been extensively investigated using Monte Carlo simulations (MCs) using the Metropolis algorithm in the context of the Blume Capel model The ground state phase diagrams have been established to display the more stable spin configurations The effects of various physical parameters on compensation and transi-

tion temperatures have been studied Additionally, triple loops have been found by exploring the hysteresis cycles, which is useful in many applications in multistate memory systems

29. Reducing Recycling Costs and Complexity through Minimized Separation Step: An Innovative Approach to Lithium Ion Battery Recycling

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Lithium ion battery recycling has become a critical focus area for environmental and economic reasons The recycling process involves various steps, including sorting, shredding, and separating materials such as Cobalt, Nickel, Manganese and Lithium, which are then reused in new battery production or other applications Battery recycling offers numerous benefits, such as reducing environmental pollution, conserving natural resources, and creating a circular economy However, there are still challenges to be addressed in the recycling process, such as developing efficient and cost effective methods for handling and processing different types of batteries Our innovative approach involves using a unique combination of technologies to recover high value product This technique can minimize recycling costs and complexity by reducing the separation stage while still producing high quality products that satisfy industry requirements

30. Evaluation of the particulate matter concentration variability related to meteorological factors in Rabat city

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The interest in air pollution factors is becoming a concern for several areas during the new era of climate change The type of pollutants changes depending on the emission sources Indeed, particulate matter (PM) is among the most common indicators of air pollution This work aims at monitoring in real time an instrument combining photometric measurements and optical pulse measurements to estimate the mass concentration of aerosols First, a corrective factor was established for bias correction under real operating conditions using a gravimetric filter study protocol as a reference method Second, a variability study of PM2 5 and PM10 concentrations was conducted in relation to meteorological variables The study allows a selection of the most influential variables on PM concentration through the visualization of their evolution during the period of study The proposed approach can serve as a model for calibration and correction of measurement data under similar conditions

31. EXPERIMENTAL INVESTIGATION OF HUMIDIFICATION DESHUMIDIFICATION DESALINATION SYSTEM COUPLED WITH HEAT PUMP

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Drought is one of the most serious problems that the world is trying to solve and the lack of access to drinking water has become the most critical problem, due to important variables, including population expansion and industrial development, especially for developing countries This project, which focuses on seawater desalination, consists of improving the energy performance of a seawater desalination system by humidification and dehumidification in conjunction with a heat pump (water/water) The heat pump is designed to supply heating and cooling to an HDH system The difference in temperature δT of the hot and cold water coming from the heat pump allows the condensation of the vapor formed on the salt water surface of the tank to be enhanced This experimental work shows the efficiency of coupling the heat pump with the HDH system, the distillate production has been improved compared to a system without a heat pump knowing that the technology only uses solar photo-

voltaic energy

32. Effects of Mg doping on physical properties of Zinc Blende Mercury Selenide HgSe compound

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Structural, electronic and optical properties of Hg1 xMgxSe (x=0, 0 25, 0 5, 0 75 and 1) alloys have been investigated by using density functional theory calculations (DFT) with the generalized gradient approximation under the Perdew-Burke-Ernzerhof (GGA PBE) method In fact, we have studied and discussed the structural, electronic and optical properties of the HgSe when substituting the Mercury Hg by Magnesium element (Mg) The calculated structural parameters show a decrease trend with increasing the concentration of doping by the Mg element The obtained results for the electronic properties indicate that HgSe is a semimetal material However, Hg1 xMgxSe (x=0 25, 0 5, 0 75 and 1) are semiconductors Also, such materials exhibit a direct bandgap at point symmetries

33. A new phosphite material as negative electrode for Li ion batteries

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Phosphites have a large applications range such as agriculture, food production, and chemical synthesis Recently, phosphites have been used in Li ion batteries (LIBs) as negative electrodes These materials provide high electrochemical stability and high energy densities Furthermore, they are characterized by their stable 3 D structure, their lower redox potential compared to the phosphorus based family which opens a new research niche in the field of electrochemical storage A new class of phosphite named (LFP) has been used as cathode material for LIBs The electrochemical results of LFP show a very low capacity of 70 mAh/g with a potential of 2 8V vs Li+/Li These features demonstrate that LFP is not a good candidate for a promising cathode material In this context, we suggest to use it as anode for Li ion batteries LFP material is synthetized hydrothermally, and tested electrochemically as anode showing a capacity of 600 mAh/g at the 2nd cycle with a potential of 0 9V vs Li+/Li

34. Nanosized phosphite compound SnHPO3: a novel anode material for all solid state Li ion batteries

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To meet the increasing safety concerns about conventional Li ion batteries, all solid state Li ion batteries (ASSLBs) attract considerable attention At present, alternative anodes for ASSLBs are of high interest Herein, we investigate tin phosphite SnHPO3 as anode material using argyrodite Li6PS5Cl as solid electrolyte Nanostructured SnHPO3 material was then obtained by ball milling and demonstrates a reversible capacity as high as 655mAhg 1 over 70 cycles in conventional Li ion half cell As for the solid electrolyte, Li6PS5Cl was prepared by mechanical milling of Li2S, P2S5 and LiCl It demonstrates a satisfactory conductivity of 1 3mS cm 1 Considering these results, galvanostatic cycling at RT was carried out in a solid state half cell consisting of a composite working electrode based on nanostructured SnHPO3 / Li6PS5Cl / carbon additive mixture and Li metal as the counter electrode The phosphite compound delivers an initial reversible capacity of 279mAhg1

35. Nettoyage des panneaux solaires par l'eau de rosee

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Plusieurs technologies de transformation d'energie renouvelable en energie electrique ou chaleur ont ete decouvertes moins d'un siecle, notamment les panneaux solaires photovoltaiques qui utilisent l effet photoelectrique en transformant la lumiere provenant du soleil en electricite par consequence, l'acces a l'eau pour les nettoyer est extrememement limite et ne peut etre achete qu'a un cout eleve, en fonction du lieu En effet, l'utilisation de l'eau de rosee pour le nettoyage des panneaux solaires est frequemment signalee comme une solution alternative, surtout dans la zone aride et semi aride Par consequence, cette quantite d eau de roseevarie du jour a jour Alors ce travail a pour objectif de montrer l'evolution des parametres climatiques qui l'influence de plus, tels que l'humidite relative, la vitesse du vent, la temperature ambiante ...etc

36. Materiaux perovskite de type ABX3 pour les application photovoltaîque

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The perovskite materials have attracted a great deal of attention because of their various interesting properties, due to their environmentally friendly nature Applying an external stress is the simplest process to improve the behavior of a material In this study, the structural, electronic and optical properties of ABX3 were investigated using density functional theory (DFT) The results suggest that the behavior of the studied compounds is improved By combining observation and analysis of the results, it appears that the electronic, optical and thermoelectric properties of ABX3 are improved under low expansion in the visible range under expansion compared to ambient conditions This proves that our stressed material is a potential candidate in photovoltaic device applications

37. First principle study and Monte Carlo simulation of full Heusler Ni2MnGa for magnetic refrigeration application

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The present work was devoted to the study of the structural, electronic and magnetic properties of the Ni2MnGa compound, as well as its magnetocaloric properties Firstly, we have defined the magnetocaloric effect which is the basis of magnetic cooling Secondly, we are interested in the family of Heusler alloys, where generalities and basic principles are given, as well as a bibliographic study to establish the state of the art of some of Heusler alloys for the application to magnetic refrigeration And finally, we used Quantum Espresso and Wien2k codes to process and treat this full Heusler compound and the effect of Ni2+xMn1 xGa doping with x=0 25, while using generalized gradient approximations, and then taking into account the Coulomb repulsion potential called Hubbard potential U = 5 eV We have used Monte Carlo simulation to study the ferromagnetic model of the Ni2MnGa system

38. Properties of Zno with DFT and Characterization of Cu doped ZnO thin film assimilated by Sputtering and Sol gel

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Zinc oxide combines low electrical resistance with high optical transparency in the visible region of the magnetic spectrum These combinations are related to the characteristics of the band structure of the semiconductor material DFT will show all of these proprieties: Band gap ; DOS ; Optical Proprieties ZnO thin films dopped Cupper were deposited, at room temperature on glass substrate, using radio frequency sputtering un-

der 30% oxygen partial pressure The Cu:ZnO nanocomposite thin films were deposited using a pure metallic Zinc target partially covered with pure Cu The Co sputtered thin films are characterized by different analyses mainly: X ray diffraction, Raman spectroscopy, MEB and optical property and the same thing for sol gel method to comparted the results XRD shows a wurtzite crystal structure of pure copper doped ZnO Calculated the refractive index, roughness and film thickness by spectroscopy to see the reaction emitted by the temperature variation effect

39. Microstructural engineering of Li1 3Al0 3Ti1 7(PO4)3 solid electrolyte for high energy All solid state batteries

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Li1 3Al0 3Ti1 7(PO4)3 (LATP) solid electrolyte (SE) with NASICON structure exhibits high ionic conductivity, low cost and superior air stability, which enable it as one of the promising candidates for all solid state batteries (ASSBs) However, LATP SE require high sintering temperature to ensure good ionic conductivity, which may cause unwanted side reactions between the SEs and electrodes The addition of sintering additives that have low melting points and are able to make liquid phases at lower temperature have proven effective in lowering sintering temperature Herein, we propose microstructural engineering of LATP using Li2O P2O5 glass additive to reduce the number of grain boundaries and promote the densification of LATP at low sintering temperature The tailored microstructure of LATP has positive effects on the electrochemical performance of ASSBs Remarkably, the assembled battery based on LiFePO4 exhibited a high capacity of 100 mAh/g at 0 02 C rate in its first charge

Thematic 9

Health Sciences

1. Identification and characterization of new anti infective solutions from the medieval Arabic pharmacopoeia

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From ancient times, Nature has provided all the essential needs for Humans for various uses and to release from sufferings Many of the natural remedies mentioned in the ancient scientific manuscripts were described largely with reference to their composition, therapeutic activities and for which disease the remedy was prescribed The objective of our multidisciplinary project is to re exploit the remedies used in the mineral pharmacopoeia of the Arab Middle Ages in order to identify new active compounds against bacterial infections We focused on a simple remedy, containing mainly metals We have been able to attribute a role for each ingredient, which span from galenic functions, to bactericidal, and anti inflammatory properties Nevertheless, as these remedies may contain toxic compounds, or compounds with weak activity, we are further looking for strategies to combine these ancient anti infective solutions with more modern vectorization tools, introducing nucleic acid aptamers

2. SarsCov 2 et procreation medicalement assistee

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En 2020, la pandemie de COVID 19 due au SRAS CoV 2 a provoque une perturbation importante dans l'acces aux services de procreation medicalement assistee (PMA) en raison du manque de donnees sur le mode de transmission du virus, sa capacite a survivre pendant la grossesse et ses effets sur les gametes, les grossesses et la sante des nouveau nes Des traitements urgents de preservation de la fertilite, permettant par exemple aux patients cancereux de stocker des gametes avant de debuter des traitements gonadotoxiques, ont ete neanmoins realises avec des mesures de securite specifiques L impact significatif sur les taux de naissances vivantes cumules en raison du retard du traitement de la fertilite etait particulierement significatif chez les femmes agees de plus de 40 ans Une revue de la litterature a ete realisee pour collecter des etudes et rapports portant sur le SRAS CoV 2 et la reproduction humaine (gametes, embryons, fonction reproductrice, fertilite et PMA)

3. Evaluation de la qualite du systeme de gestion des dechets hospitaliers cas de CHU Mohamed 6 Marrakech

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La gestion des dechets hospitaliers est cruciale pour l environnement et la securite publique Une enquete descriptive a evalue la gestion des dechets medicaux et pharmaceutiques (DMP) dans deux etablissements sanitaires de Marrakech Malgre les efforts de la direction, les dechets hospitaliers sont mal

geres, avec un faible niveau de formation du personnel (85 %) et des pratiques inadequates, telles que le non tri des DMP (75 %) Il est urgent de mettre en place de nouvelles strategies mieux organisees et structurees, ainsi que de former le personnel a une gestion durable et efficace des dechets hospitaliers

4. Evaluation of an in house real time PCR for detection of Neisseria gonorrhoeae from anal specimens

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Background Laboratory diagnosis of gonococcal infection is based on direct detection of the pathogen in clinical specimens In Morocco, microscopy and, in certain circumstances, culture are used to make the first laboratory diagnosis of gonorrhea However, for routine gonorrhea diagnosis, no NAAT has been developed The purpose of this study is to develop and evaluate a sensitive and specific in house real time PCR assay for the detection of Neisseria gonorrhoeae DNA Methods and Results Samples from 245 patients were tested by real time pcr targeting por A pseudogene The performance characteristics (sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV)) of the in house real time PCR assay were evaluated in comparison to GeneXpert assay The in house real time PCR assay that targets the porA pseudogene showed a high sensitivity and specificityand appears to be a routine technique for the detection of N gonorrhoeae in clinical specimens

5. Synthesis of new molecules of pyrazole acetamide and pyrazol benzimidazole from 1,5 benzodiazepine and study of its crystallographic and antioxidant properties

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Abstract : 1,5 Benzodiazepines and their derivatives have experienced an increase in their use as important raw materials for obtaining various heterocyclic systems such as pyrazolyl acetamides and pyrazolyl benzimidazoles [1,2], structural alterations of these heterocyclic compounds have significant corrosion inhibition activities [3] and have allowed the creation of complexes with interesting activities [4] In this sense, using Z 4 (2 oxopropylidene) 1,5 benzodiazepin 2 ones, we synthesized new compounds of the pyrazolyl acetamide and pyazolyl benzimidazole series, by condensation with hydrazine monohydrate The structures of the synthesized compounds were established on the basis of 1H NMR, 13C NMR spectroscopic methods and mass spectrometry In addition to the synthesis, we also report the crystal molecular structures using single crystal X ray diffraction [5] The synthesized products proved to have interesting antioxidant properties

6. Development and prospective validation of an RT qPCR based test for the quantification of HER2 gene expression in breast cancer

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Detection of the human epidermal growth factor receptor 2 gene (HER2) expression is important to decide a treatment strategy for BC patients The reference methods for determining HER2 protein expression are IHC and FISH Although both methods are reliable, they are complex, time consuming, and expensive In the present study, we performed a prospective approach to evaluate a one step RT qPCR method in the determination of HER2 status We compared IHC and FISH to the RT qPCR in 275 formalin fixed and paraffin embedded FFPE tissue samples from BC patients The concordance between RT qPCR and IHC results was 95 53% , whereas that of RT qPCR and FISH attained 100% Our results demonstrate high clinical performance, confirmed by Sensitivity and Specificity values of 89 4% and 100% respectively for a threshold value of 11,954 (AUC = 0,955) In conclusion, this prospective study shows that the RT qPCR could be the first choice for determin-

ing HER2 expression in clinical samples of BC

7. Analysis of the impact of the vulvo vagino cervical / HPV microbiota on cervical cancer in Morocco: Case / control study

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Cervical cancer (UCC) is the second most common cancer among women in Morocco Given the lack of a national cancer registry in Morocco, published data is limited to the number of cases recorded at specific oncology centers, meaning that the incidence of cancer is likely significantly greater than projected UCC is identified late and at an advanced stage of the disease since it progresses slowly and usually without symptoms There is a need to seriously consider a properly organized screening program, taking into account what we already know about the attitudes and knowledge of Moroccan women, economic factors, and psychosocial issues related to the screening method Almost all UCCs are linked to high risk human papillomaviruses (HPV), especially HPV16 and HPV18 Two preventive vaccines targeting these two HPV genotypes have been commercially available for more than ten years

8. Platelet function in viral immunity and SARS CoV 2 infection

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Platelets, as nonnucleated blood components, are classically recognized for their pivotal role in hemostasis In recent years, however, accumulating evidence points to a nonhemostatic role for platelets, as active participants in the inflammatory and immune responses to microbial organisms in infectious diseases This stems from the ability of activated platelets to secrete a plethora of immunomodulatory cytokines and chemokines, as well as directly interplaying with viral receptors While much attention has been given to the role of the cytokine storm in the severity of the coronavirus disease 2019 (COVID 19), less is known about the contribution of platelets to severe acute respiratory syndrome coronavirus 2 (SARS CoV 2) infection Here, we give a brief overview on the platelet contribution to antiviral immunity and response during SARS CoV 2 infection

9. Breast cancer recurrence prediction using machine learning algorithms

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The use of artificial intelligence (AI) in medical physics could revolutionize decision making in radiation therapy, allowing medical physicists to create highly personalized treatment plans Accurate prediction of cancer recurrence is crucial for improving patient outcomes Machine learning algorithms can be employed to predict breast cancer recurrence, including both triple negative breast cancer (TNBC) and non triple negative breast cancer (non TNBC), by utilizing clinical and pathology data, DCE MRI imaging features, or a combination of both Precision, recall, F1 score, and ROC curve were used to evaluate the predictive power of the approaches The results showed that using only DCE MRI imaging features yielded excellent predictive power compared to the other approaches

10. Cancer colorectal et metabolisme des folates

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Le cancer colorectal (CCR) est une maladie complexe qui fait intervenir de multiples facteurs genetiques et nutritionnels Les folates jouent un role preventif dans la carcinogenese colorectal, probablement en raison de son implication dans les processus de methylation et de synthese de l ADN D autres nutriments tels que la methionine, la vitamine B 6 et la vitamine B 12, qui interagissent metaboliquement avec le folate dans ce processus, peuvent egalement influencer le risque de CCR Notre objectif est d etudier les

polymorphismes C677T et A1298C du gene MTHFR et le complexe MTR et MTRR dans la survenue du CCR dans la population marocaine L etude est faite sur 100 patients atteints de CCR confirme histologiquement en comparaison avec 100 sujets temoins indemnes de la maladie selon le protocole suivant : Extraction d'ADN ; PCR en temps reel ; Sequencage d'ADN par technique de Sanger

11. L'impact de l'interposition d'un corps entre une source et une cible sur le rendement en profondeur d'un faisceau de proton de 150MeV et la fluence des neutrons secondaires: investigation a laide du code Monte Carlo FLUKA

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etude experimental realise avec FLUKA une geometrie simple a ete modelisee par FLAIR Des faisceaux mono energetiques de proton 150MeV de distribution normal emis d'un point situe a 100cm de la cible Les corps traverses sont de differentes natures Resultats le parcours d'un faisceau de proton de 150MeV dans un fantome est une propagation quasi rectiligne qui se materialise enfin de parcours par une forte depot de dose connu sous l'appellation de Pic de Bragg a une profondeur de 16Cm dans le fantome d'eau Cependant la presence des corps sur la trajet du faisceau modifie le rendement en profondeur, laterale et meme la fluence des particules secondaires telles les neutrons comme l'illustre notre etude Les modifications apportees par corps interposes varie les un des autres,ce du faite de leurs compositions chimique les tissus mous agissent peu sur la modifications de trajectoire du faisceauque les tissus compact ou encore d'autres corps constitue de plomb,zinc

12. epigenetique des cancers gyneco-mammaires

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Background: Ovarian cancer (OC) is one of the most lethal gynecologic malignancies in the world However, it is still underdiagnosed and underreported in nearly all low income countries The aim of this work is to characterize ovarian tumors and evaluate clinical changes across the ovarian subsets Methods: A total of 112 ovarian tumors were analyzed Clinical data were collected from medical records Results: Among the recruited patients, 14 were diagnosed with ovarian cancer, seven with rare borderline tumors, 72 with benign tumors, and 19 with normal ovarian tissues Women with ovarian cancer are all postmenopausal, while benign and borderline tumors occur in pre menopausal women Most ovarian tumors are determined to be bilateral Conclusion: Classifying ovarian tumors according to their clinical parameters as well as their genetic and molecular changes and relating this to whether the tumor was benign, borderline, or malignant could be promising for new diagnostic biomarkers

13. Clinical Significance of Somatic Mutations in RAS/RAF/MAPK Signaling Pathway in Moroccan and North African Colorectal Cancer Patients

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CRC patients with mutations in KRAS, NRAS, and BRAF have a poor response to anti EGFR targeted therapy We evaluated these mutations in 80 Moroccan CRC patients using pyrosequencing assays The study found RAS mutations in 57 5% of patients, with 56 2% in KRAS and 8 8% in NRAS The most common KRAS mutation was G12D, associated with higher tumor stages Proximal colon tumors were more likely to have KRAS mutations The NRAS gene had 57 1% , 28 6% , and 14 3% mutation rates in exons 2, 3, and 4, respectively G13A and Q61H were the most common NRAS mutations No mutations were identified in the BRAF gene Identifying these mutations in CRC patients can guide treatment decisions

14. The neuroprotective role of melatonin rhythm against seizures in a PTZ model of epilepsy

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Epilepsies are a group of chronic neurological disorders characterized by recurrent, unprovoked, and unpredictable seizures It affects approximately 65 million people around the world Most previous studies support anticonvulsant properties of melatonin, but less is known about its endogenous rhythm Bilateral superior cervical ganglia (SCG) removal disrupts melatonin rhythmicity Therefore, the main purpose of this work was to investigate the neuroprotection effect of melatonin rhythm against epileptic seizures by an irreversible suppression of its nocturnal secretion Male adult Wistar rats weighing 200 - 250 g were used and randomly divided into four groups 2 weeks after superior cervical ganglionectomy (SCGx), generalized seizures were induced by acute intraperitoneal administration of Pentylenetetrazol (PTZ) All animals were tested to assess anxiety and recognition memory following acute seizure SCGx worsens seizure severity

15. Etiologie virale des syndromes grippaux et infection respiratoires aigues severes au Maroc, septembre 2014 a decembre 2016

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Rares sont les donnees disponibles sur l etiologie virale des syndromes grippaux (SG) et des infections respiratoires aigues severes (IRAS) chez les patients au Maroc Pendant 2 saisons, nous avons recrute de maniere prospective des patients hospitalises et externes repondant a la definition de cas de (SG) et (IRAS) a partir de 59 sites sentinelles Les echantillons ont ete testes par RT PCR en temps reel pour detecter 16 virus respiratoires circulants Au moins un virus respiratoire a ete detecte dans 70,8% des 2009 specimens traites Les virus de la grippe A et B etaient les plus courants, detectes dans 30,4 % des cas, suivis du virus respiratoire syncytial (VRS) dans 17,9 % et du Rhinovirus humain dans 13,1 % Le VRS etait plus repondu (36,6 %) chez les enfants moins de 5 ans alors que le virus Influenza predominait les infections chez les adultes (53,0 %) En conclusion, le VRS etait predominant parmi les cas d IRAS au Maroc, en particulier chez les enfants de moins de 5 ans

16. Practical application of a dosimetric CT: between adult and pediatric patient phantoms

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Treatment of patients with radiotherapy cannot be designed without guaranteeing the dose that patients will receive The medical physicist is the guarantor of the dose delivered to the patients, and this treatment consists of a succession of stages: preparation and restraint, simulation of acquisition scanner, treatment planning (ballistics, dosimetry), first position and control of the treatment In this work we will focus on a dosimetric study of dosimetric scanners because they are important especially since the dosimetric CT scanner is the first essential step and the basis of the treatment chain in radiotherapy For this type of control, we switched to an oncology center in order to obtain reliable and honest results, of which we could find that the quality control tests carried out by PMMA32 by varying the kV from 80 to 120 gave satisfactory results, the thing that we could not obtain with PMMA16

17. Mentha rotundifolia (L) Huds aqueous extract attenuates H2O2 induced oxidative stress and neurotoxicity

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Oxidative stress plays a causal role in neurodegenerative diseases The aim of this study

is to evaluate the antioxidant effect of widely used Moroccan plant Mentha rotundifolia (L) Huds (M rotundifolia) in traditional medicine as well as a condiment The chemical composition of M rotundifolia aqueous extract was analyzed by liquid chromatography coupled to mass spectrometry (LC MSM) 2,2 diphenyl 1 picrylhydrazyle (DPPH) and 2,2 azino bis 3 ethylbenzothiazoline 6 sulfonic acid (ABTS) tests were used to assess its in vitro antioxidant activity H2O2 induced oxidative stress animal model was then used to confirm the protective effect of M rotundifolia extract in vivo The obtained results suggest that M rotundifolia has a potential neuroprotective effect, and may prevents oxidative stress by inducing a mild hyperbilirubinemia

18. Screening and follow up of patients affected by the hepatitis C virus in Morocco within the framework of the National Program for the Fight against Viral Hepatitis

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Intro: HCV public health problem In Morocco, DAAs marketed in generic at accessible price and effective, which represents an opportunity to eliminate HCV Objectives: Show the interest of screening, follow up under and after treatment of patients diagnosed in the LMB (IPM) within the frame ofPNLHV launched by the Ministry of Health in collaboration with the WHO Methods: The study was conducted(2022 2023) in LMB (IPM) on 200 HCV positive patients HCV viral load was performed by RT PCR Results: Preliminary results show PCR is negative for 50 patients while 150 are chronic HCV carriers who require treatment, the mean age 54 6715 35years, women are more affected than men(sex ratio M/F: 0 90),the average viral load 5 250 35log10UI/mL A control PCR 12 weeks after stopping the treatment, HCV RNA is undetectable for all Conclusion: Our study reveals important info of the problem of HCV in Morocco No effective vaccine, why the interest of screening and monitoring for eradicate HCV

19. Ex vivo model of synaptic plasticity mediated by differential manipulation of tonic frequencies

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Dopaminergic neurons in the striatum play a critical role in regulating movement and reward These neurons exhibit two types of firing patterns: tonic and phasic Tonic firing is a steady, low frequency firing that is involved in the regulation of basal ganglia circuitry, while phasic firing is crucial for reward A notable distinction between the two systems is the presence of tonic activity in vivo, which is absent in the ex vivo model This absence could be accountable for several key plasticity mechanisms, such as long term potentiation and long term depression, that are only observed in an intact brain This study aims to bridge this gap by mimicking the patterns of in vivo activity in ex vivo preparations Our data investigate the relevance and translation potential of ex vivo studies in understanding the intact brain plasticity, as well as provide insight into mechanisms underlying dopaminergic neuron plasticity due to changes in synaptic inputs and striatal circuitry

20. Impact de l alimentation sur la sante publique au Maroc, du diagnostic au deploiement de recommandations

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Mon travail de these s inscrit dans le cadre du projet de developpement durable et plus precisement sur le troisieme objectif qui est de promouvoir la bonne sante et le bien etre pour tous Il s agit d etudier l impact de l alimentation sur la sante publique au Maroc en travaillant dans un premier temps sur la population active de la region de Rabat Sale, agee de 15 ans et plus

21. Mercurial waste from dental amalgam: what risk to the environment?

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When we talk about the toxic risk in odontology, the first material that comes to mind is the amalgam and the mercury in it Yet it is the oldest coronary restoration material (nearly 200 years), the one with the most clinical recoil However, this material has always raised controversy, which blames it for systemic toxicity to humans (neurotoxicity, nephrotoxicity, fetal abnormalities, etc), and impacts on the environment At a time when waste recycling has become a vital issue for the environment and quality of life, handling such a polluting product raises questions about the impact of dental activity on the environment Through this work, we will try to shed light on the harmful effects blamed on this material, on the fate of mercurial waste from dental offices and the responsibility of the dental profession in mercurial pollution

22. Restraint Stress Exacerbates Apoptosis in a 6OHDA Animal Model of Parkinson Disease

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This study examined the effect of subchronic restraint stress on dopaminergic activity, iron levels, and pro apoptotic factors in a rat model of Parkinson s Disease (PD) induced by 6 hydroxydopamine (6 OHDA) Results showed that stress exacerbated motor coordination deficits and anxiety in 6 OHDA treated animals, but not in animals receiving saline 6 OHDA decreased dopamine levels, increased iron accumulation, and induced overexpression of the pro apoptotic factors caspase 3, p53 and AChE Moreover, post lesion restraint stress worsened the expression of caspase 3 and AChE without affecting p53 expression, suggesting that subchronic stress may worsen apoptosis and contribute to dopaminergic neuron loss in the striatal regions and exacerbate the progression of PD

23. Microbiome of the built environment

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The built environment is a complex ecosystem that hosts numerous organisms including bacteria, viruses, and fungi, which collectively constitute the microbiome of the built environment Microbial communities that inhabit all types of buildings can directly or indirectly affect human health Therefore, understanding the relationship between built environments, microbiomes, and occupants is fundamental in order to promote the health and wellbeing of occupants Classical microbiological methods are still the gold standard for studying the indoor microbiome, however, advanced high throughput molecular techniques are becoming the trend these days due to their ability to provide valuable data on the taxonomy and functional profiling of indoor microorganisms

24. Design, Synthesis, and Insecticidal Activities of Novel Isoxazoline sulfonamide Hybrid against Sphodroxia Maroccana Ley

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Abstract: Sphodroxia maroccana Ley is a pest of cork oak crops that damages the roots of seedlings and can severely impair cork oak regeneration Since the banning of two insecticides (Carbosulfan and Chlorpyriphos) widely used against the larvae of Sphodroxia maroccana because of their high toxicity and impact on the environment, until now there is no pesticide against these pests Therefore, it is particularly urgent to develop highly effective insecticidal molecules with novel scaffolds Isoxazolines are a novel class of insecticides that act on aminobutyric acid ”GABA” managed chloride channels In line with this consideration, and as a continuation of our

research program A green tandem one pot synthesis of novel 3,5 disubstituted isoxazoline sulfonamide derivatives was achieved in water via ultrasound assisted four component reactions, and their insecticidal activities against fourth instar larvae of S maroccana were evaluated for the first time

25. ETUDE DE L'EFFET ANTIDIABETIQUE DES EXTRAITS DE CANNABIS SATIVA L ET DES CANNABINOIDES SYNTHETIQUES CHEZ DES SOURIS SUISSES RENDUES DIABETIQUES

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Le diabete est une maladie chronique et multifactorielle, caracterisee par une hyperglycemie chronique, qui s'accompagne de graves complications La forme la plus frequente de ce dernier est le diabete de type 2 De ce fait, notre travail s'interesse a l'etude de l'activite antidiabetique des extraits de Cannabis sativa L et des cannabinoides synthetiques, dont le cannabidiol (CBD), dans un cas de diabete de type 2 provoque experimentalement chez des souris suisses, par un regime hypercalorique riche en graisse Une injection intraperitoneale de Win55 212 2, un agoniste du CBD, sera administree quotidiennement a une dose de 1,2 mg/kg pour deux lots d'essais, compares a des temoins, pendant 4 mois Des injections intraperitoneales repetees de streptozotocine (STZ) a faible dose de 40 mg/kg vont etre administrees, egalement, pendant 6 semaines, tous les deux jours, 3 fois au total pour deux autres lots d'essais

26. Mutation status of full RAS and BRAF in 169 Moroccan Colorectal cancer patients

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Colorectal cancer (CRC) is classified as the first digestive cancer and remains a burden in Morocco Our study aimed to investigate the frequency of the full RAS (KRAS, NRAS) and BRAF genes in CRC patients from Morocco Archived FFPE of 169 CRC patients were screened for KRAS, NRAS, and BRAF mutations by Idylla; technology Full RAS mutations were identified in 46 1% In the KRAS gene, exon 2 mutations accounted for 84 5% Outside exon 2, the mutation rate was 35 1% In the NRAS gene, the mutation rates of exon 2 and 3 were 71 4% and 57 1% respectively Of the 169 samples, mutations in the BRAF gene at V600E were detected in 3 5% There was an association between KRAS mutations and age, which were higher in the age group gt;50 Besides established anti CRC treatment, a better understanding of the causality of CRC can be established by combining epidemiology and genetic/epigenetics on CRC etiology in Morocco

27. Host genetic predisposition to COVID 19 and oxidative stress

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Our scientific research work addresses the issue of clinical variability in COVID 19 patients, which is poorly understood and could be the source of genetic variability and/or redox imbalance My thesis project funded by the Moroccan Royal Academy of Sciences consists in searching for candidate pathogenic mutations by NGS analysis of genes involved in antiviral immunity The objective of our study is to identify the pathogenesis of severe forms of COVID 19 without risk factors, and thus the essential immune response circuits involved in host defense against SARS CoV 2 We thus focused on the JAK/STAT pathway in 120 Moroccan patients infected with SARS COV2 Pathogenic mutations in TYK2 gene have been identified In this regard, we will focus on two main aspects The first is on the pathogenic mutations in genes involved in immune response circuits In the second part, we evaluate the crosstalk between SARS CoV 2 and oxidative stress, and the mechanisms that aggravate the disease

28. The Role of Deep Learning in Advancing Breast Cancer Segmentation Using Different Imaging Modalities

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Breast cancer is a major public health problem affecting millions of women worldwide Early detection and accurate diagnosis are essential for effective treatment and better patient outcomes Medical imaging techniques, including mammography, ultrasound, and magnetic resonance imaging (MRI), are essential for detecting and diagnosing breast cancer In recent years, artificial intelligence (AI) has been widely used to improve the early detection and treatment of various types of cancer, including breast cancer, thereby increasing the chances of patient survival However, accurate segmentation of breast cancer regions from medical images can be challenging due to the complexity and heterogeneity of breast tissue This study concludes that deep learning algorithms have great potential to improve the accuracy of breast cancer segmentation, which could lead to better diagnosis and treatment

29. Synthesis of novel N1 substituted benzimidazole derivatives: caracterisation by 1H and 13C NMR, and crystal X ray diffraction

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Hetorocyclic chemistry containing nitrogen, oxygen and even sulfur has become the main interest of scientists because of the biological interest that a wide range of heterocyclic compounds present In this family, it has been shown that benzimidazole derivatives have varied biological activities including neuroprotective, antimicrobial , antifungal , as well as functioning as anticancer , antiviral , anti inflammatory , antioxidant , and antidiabetic activities In this work, we describe a simple and efficient route for the synthesis of novel N1 substituted benzimidazole derivatives (4-6) by a rearrangement reaction of N1 alkyl 1,5 benzodiazepine 2 thiones (1-3) in the presence of hydroxylamine hydrochloride in boiling ethanol The title products were identified using 1H and 13C NMR spectroscopic measurements and confirmed by single crystal X ray diffraction techniques

30. Profile distribution of Covid 19 vaccines for Spatio temporal vaccination

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Ensuring an efficient and equitable distribution strategy is a serious challenge given the continuous and rapid development of COVID 19 on one side and the scarcity of vaccine doses on the other side By using the SLIR spatio temporal compartmental virus propagation model applied to the case of SARS CoV 2 virus, we aim to provide a means of applying the appropriate vaccination strategy and the most optimal way of distributing the available doses of vaccine We investigate a profile distribution of vaccine doses to the subpopulations of a given geographical area of study based on Maxwell Boltzmann and Fermi Dirac distribution Our findings show that the priority regime and the anti priority regime are both efficient and show good performance but each in its own parameter range

31. le mercure dans les produits eclaircissants et leur impact sur la sante humaine

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Le mercure est un metal toxique qui peut avoir de graves effets sur la sante, notamment des lesions renales, une depression anxieuse et une neuropathie peripherique Outre les sources traditionnelles de mercure telles que l'industrie miniere, de nouvelles sources d'exposition au mercure sont apparues avec les cosmetiques tels que les savons et les

cremes eclaircissants Dans cette etude vingt echantillons (20) de cremes eclaircissants ont ete analyses pour la determination du mercure, les echantillons ont ete collectes dans divers magasins de produit de beaute sur le marche local de Rabat Les niveaux du mercure ont ete determines a l'aide d'un analyseur de mercure direct, la concentration de mercure dans les cremes allait de moins 0 4 PPM a 7 PPM; six echantillons de cremes avaient des concentrations superieurs aux limites maximales admissible par specifications de l'US Food and Drug Administration's (USFDA) limite maximale acceptable est de 1 PPM

32. An efficient green synthesis of novel 1,4 disubstituted 1,2,3 triazole pyrimido benzimidazoles hybrids

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Pyrimido benzimidazoles and 1,2,3 triazoles are two heterocycles well known for their broad spectrum of biological activities, such as antimicrobial and antiviral properties The combination of these two biologically active motifs in a single molecule has been of great interest in medicinal chemistry Molecules containing fused pharmacophores, known as hybrids, have shown several advantages, particularly their ability to activate multiple targets simultaneously, there by enhancing their therapeutic efficacy In line with this consideration, and as a continuation of our research program, wherein report a highly selective synthetic procedure for the synthesis of novel 1,4 disubstituted 1,2,3 triazole pyrimido benzimidazoles

33. Acute toxicity, Neurotoxicity and analgesic effect of Cannabis sativa L extract: Khardala Moroccan variety

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The present study aims to investigate the oral acute toxicity and neurotoxicity of Khardala extract (KH) in mice, and evaluate its analgesic effect The DL50 of KH extract was estimated to be greater than 2000 mg/kg While several signs of neurotoxicity were observed in mice treated with 2000 mg/kg, alongside hepato renal toxicity, evidenced by elevated levels of ALAT, ASAT, total bilirubin, and creatinine in mice received this dose The administration of KH extract at 500mg/kg significantly elongates the reaction time of mice in tail emersion test in comparison to control mice Acetic acid induced writhing test revealed that the writhing frequency in mice administered the KH extract was significantly lower from that recorded for the control group and mice which received cannabidiol or morphine KH extract possesses potent analgesic activity than the cannabidiol alone, which could be related to the synergy between cannabidiol and others cannabinoids contained on KH extract

34. Study of the rheological properties of blood in cardiovascular vessels

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Blood represents a very complex fluid medium that is difficult to describe theoretically due to changes in its properties and complex mechanical and biochemical structure that depend on its scale Pathologies associated with blood flow and cardiovascular functions are the leading cause of mortality worldwide Therefore, intensive multidisciplinary research is essential to develop innovative approaches to identify key elements that promote cardiovascular disorders In this thesis, we aim to develop simple models to better understand the rheological behavior of blood (viscosity and flow) under the influence of various constraints (shear, confinement, pressure, etc) using numerical methods such as the boundary integral method, the finite element method, and the Lattice Boltzmann method

35. Prevalence and patterns of mutations in RAS/RAF/MEK/ERK/MAPK signaling pathway in colorectal cancer in North Africa

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Colorectal cancer (CRC) ranks third (1 93 million new cases) after breast and lung cancer in both sexes combined, with a mortality rate of approximately 935,173 deaths in 2020 It is a complex and genetically heterogeneous disease involving oncogenes and tumor suppressor genes The RAS/RAF/MEK/ERK/MAPK signaling pathway is the best known in colorectal carcinogenesis Using electronic databases, a systematic review was performed to discuss the results of the analyzed data examining KRAS, NRAS and BRAF gene mutations in North African CRC patients, to compare their prevalence with that shown in other populations and to clarify the role of diet in CRC Seventeen studies were identified including 6 in Morocco, 8 in Tunisia, 2 in Algeria and 1 in Libya A total of 1843 CRC patients were included 576 (31 3%) in Morocco, 641 (34 8%) in Tunisia, 592 (32 1%) in Algeria and 34 (1 8%) in Libya Overall, The mutation rates of KRAS, NRAS and BRAF genes were 46 4% , 3 2% and 3 5% , respectively

36. Valorisation ethnomedicinale, biochimique et pharmacologique de quelques plantes medicinales de la Province de Settat

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Verbena officinialis and Cymbopogon citratus are among the most widely used plants in traditional medicine worldwide including the Moroccan population due to there pharmacological properties The purpose of this work is to carry out a determination of the phenolic compounds and to study and compare the antioxidant and antityrosinase activities of the phenolic extracts of each plant Antioxidant activity was assessed through analyzing ultrasonic phenolic extract by DPPH, H202 as well as determining the total phenolic, flavonoid and total tannins contents, while the effect on tyrosinase was studied using L DOPA as a substrate The results revealed an interesting in vitro antioxidant and antityrosinase activities

37. capillary network flow of white blood cells in vivo

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Leukocytes, also known as white blood cells, constitute approximately 1% of the total blood volume in most mammals The flow of these cells ensures the body s defence against various viral and bacterial infections WBCs exhibit two modes of motion: a fast flow mode and a slower rolling modes where they partly adhere to the wall, whereas RBCs simply flow with the surrounding fluid in this study, we aim to investigate the effect of geometry and distribution on WBCs by fluorescence microscopy and compare their behavior in different networks of vessels

38. NANOTECHNOLOGY RENOVATES TISSUE ENGINEERING IN DENTAL IMPLANTOLOGY

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The use of implantology is a daily practice, except that it has therapeutic limits, mainly in case of insufficient bone capital on the implant site In witch situation, only a bone graft can make the implant indication possible While autografts are considered the gold standard, they nevertheless have drawbacks such as limited availability and risk of donor site morbidity, allografts and xenografts overcome the above limitations, but are susceptible to triggering immune rejection or transmit disease The use of substitute materials presents a solution that promotes bone growth, although their useful-

ness remains to be discussed, particularly in the presence of peri implant resorption In recent years, tissue engineering offers a promising alternative In this work, we are going to present to you the new formulas using nanotechnology, which promise to overcome the drawbacks of conventional methods with results equivalent to those of autograft

39. Caracterisation of non polio enterovirus isolates from acute flaccid paralysis children in Morocco reflects rare genotypes: EV A76, EV B74 and EV C99

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Human Enteroviruses (HEV) constitute the largest genus within the family Picornaviridae They are grouped into four species (A, B, C, and D) and have 120 different serotypes Most viruses in this genus cause infections in humans, ranging from mild respiratory illnesses to severe neurological diseases such as meningitis, encephalitis and poliomyelitis The 5′ untranslated region (UTR) of HEV is fundamentally important for efficient virus replication and for virulence, and can be used for virus identification and evolutionary studies 5′UTR sequence analysis of 57 strains of enteroviruses detected in stool specimens of children suffering from acute flaccid paralysis, revealed serotypes that had been infrequently reported: EV A76, EV B74 and EV C99 This study also highlights the probable role of non polio viral etiologies associated with AFP and needs to plan new strategies especially during the post polio eradication era

40. Segmentation of proliferating nuclei of tumour spheroids

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Tumor cell proliferation is a key process in tumor development and progression, thus identification and quantification of proliferating cells can provide valuable information on tumor aggressiveness. The goal of this future work is to segment the proliferative nucleus of the tumor spheroids, which is important to reveal why Segmentation of tumor spheroid proliferating nuclei is important for several reasons. In addition, segmentation of proliferating nuclei can help identify areas of tumor necrosis. Tumor necrosis occurs when tumor cells can no longer get enough oxygen and nutrients, causing them to die. Therefore, segmentation of proliferating nuclei can help identify these regions and better assess the extent of disease. Finally, segmentation of proliferating nuclei is also useful for monitoring treatment effects.

To do this there is some steps:

1. Data preprocessing: Perform preprocessing such as normalization and size adjustment on the image to ensure compatibility with the CNN model. 2. CNN model construction: use U-Net, ResNet or DenseNet and other architectures to segment the CNN model construction of tumor spheroid proliferation nuclei.

3. Data Split: Divide the data set into three parts: training, verification and testing, one part is used for training, one part is used for verification, and the other part is used for testing.

4. Model training: Use the training data and the corresponding loss function to train the CNN model, such as B. Weighted cross-entropy loss or Dice loss. You can also use an optimizer like Adam to minimize the loss function.

5. Model Validation: Use the validation data to evaluate the performance of the model. Evaluation metrics such as accuracy, sensitivity, and specificity can be used to evaluate the performance of the proposed model.

6. Model testing: Test the final model against the test dataset to evaluate the performance of the model on unknown data.

7. Post-Processing: Perform post-processing to improve segmentation quality, such as B. Erosion, dilation or removal of small objects.

41. POFUT1 et miARN, une combinaison de biomarqueurs pour le cancer colorectal ?

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Dans la recherche de nouveaux marqueurs de diagnostic, pronostiques et d'outils therapeutiques, il a ete montre que des deregulations de genes codant des glycosyltransferases induisaient des alterations de motifs glycaniques, associees a une augmentation des capacites proliferatives et migratoires des cellules cancereuses La surexpression du gene codant la O fucosyltransferase POFUT1 est liee a la tumorigenese dans de nombreux cancers POFUT1 est surexprime dans le cancer colorectal des le stade I, avec 76% des tumeurs ayant une amplification de la region chromosomique correspondante Or des tissus cancereux sans amplification presentent cette surexpression, suggerant une regulation post transcriptionnelle par des miARNs Notre etude vise a explorer des bases de donnees publiques et a utiliser des approches transcriptomiques et de suivi cellulaire sur des lignees et tissus, pour caracteriser des miARNs differentiellement impliques dans la pathologie cancereuse et associes a POFUT1

42. HLA G : Biomarqueur de l'implantation des embryons des patients infertiles

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Les echecs de la Fecondation In Vitro (FIV) Micro injection cytoplasmique du spermatozoide (ICSI) est un des problemes majeurs qui preoccupe les centres d'Assistance Medicale a la Procreation (AMP), surtout quand les causes restent inexpliquees (dans 10% des cas) En effet, l'implantation embryonnaire est une etape majeure qui decide la reussite de la FIV Les etudes ont montre que les echecs d'implantation embryonnaire sont dus a la receptivite endometriale, soulignant la necessite d'etudier en profondeur la communication immunitaire entre l'embryon et l'endometre Un des messages cles de cette communication est l'HLA G (Human Leukocyte Antigen G) L'HLA G est une molecule d'histocompatibilite, elle participe a la regulation de la reaction immunitaire entre la mere et le foetus, pour empecher son rejet En effet, il a ete demontre que la cause principale est immunitaire, ce qui nous encourage d etudier l HLA G pour cette categorie de patientes

43. One pot green synthesis of new hybrid isoxazole/isoxazoline triazole compounds

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The 1,3 dipolar cycloaddition is a reaction who had great interest over the past years, especially in heterocyclic synthesis(1) Moreover, it is the leading key to different cycloadducts, particularly isoxazoles and 1,2,3 triazoles; which have proven in recent years their potency in the medicinal and therapeutic field(2) Therefore, several works have described the synthesis of new compounds based on isoxazole triazole conjugates, which had subsequently proved noticeable activities mainly as antibacterial and anticancer agents(3) In this context, we aimed to synthesize a new series of hybrid isoxazole triazoles starting from commercial propargylic alcohol in four steps including sulfonylation, azidation and two 1,3 dipolar cycloaddition reactions

44. Design, Green Synthesis and In Silico activity of anti cancer and anti inflammatory activity of Novel Indole analogues

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In this study, we have designed and synthesized a series of novel indole derivatives as a promising chemical library as bioactive agents through in silico screening These

products were successfully synthesized from a Indole 3 carboxaldehyde,1 by 1,3 dipolar cycloaddition and condensing with a series of aza heterocyclic employing a green ultrasonochemical method using green conditions The synthesized molecules were evaluated for their pharmacological activity The results suggested that some indoles disubstituted in position 1 and 3 were found promising candidates for the development of novel anti cancer and anti inflammatory agents

45. Tensor numerical methods

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In recent years, tensors have been increasingly utilized in several research areas such as nonlinear optimization, multilinear algebra, nonlinear analysis, statistics, and programming language due to their efficiency in modeling real data compared to matrices. However, the processing of real data from different problems often results in overwhelming demands on computer resources.

To address this challenge, this thesis proposes a study on the generalization of numerical ma- trix methods through the tensor formalism. The focus is on the extension of Krylov subspace

methods and their applications. The study introduces global and block Krylov subspace methods

related to various tensor products and develops a new class of methods called tubal Krylov sub- space methods. The aim is to provide more efficient solutions to problems in the field of tensor

computation.

46. Humoral and Cellular immune responses Against COVID 19 and vaccination

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The Humoral immune system is important for control of most viral infections B cells which are the source of antibodies are the fundamental component of this response and in the vaccination responses Specially for SARS CoV 2 that caused serious health crises globally Multi agency research efforts have been geared towards developing vaccines for active immunization to prevent COVID 19 infection This paper is geared towards providing concentrated information on the natural humoral anti SARS COV 2 response after infection and after administration of the two vaccines mainly used in Morocco: BBIBP CorV and ChAdOx1 nCoV 19; their efficacy word wild and all the aspects from neutralizing antibodies, cross reactive responses and the mechanism recently determined the vaccine breakthrough following the emergence of variants

47. Prevalence of BRCA1 promoter methylation in breast cancer of Moroccan women

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Breast cancer is a major health problem worldwide, and epigenetic alterations, including DNA methylation, have been shown to play a critical role in its development and progression Aberrant DNA methylation patterns, such as hypermethylation of tumor suppressor genes, are frequently observed in breast cancer In particular, hypermethylation of tumor suppressor genes such as BRCA1 is a common epigenetic alteration observed in breast cancer To investigate the prevalence of BRCA1 promoter methylation in breast cancer in a Moroccan cohort, we used methylation specific PCR to analyze 84 mammary tissues, including malignant and premalignant lesions Our results revealed a significant increase in the frequency of BRCA1 promoter methylation (31/84: 36 9%), which is considerably high as reported by previous studies These findings suggest that BRCA1 promoter methylation may serve as a potential biomarker for breast cancer in Moroccan women

48. Cervical cancer Biomarkers

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Purpose: In this project we aim to explore new potential biomarkers of cervical cancer contributing to its early detection and improving its prognosis Materials: cervical and uterine FFPE tissues and cervical cell lines Methods: DNA and RNA extraction is performed using special kits The extracted RNA/DNA is used to perform different molecular tests (PCR, qRTPCR, MSP) HPV Positive samples will be sequenced (UATRS/CNRST) to determine HPV genotype Cell lines are maintained using routine cell culture techniques Clinical characteristics (age; stage) and HPV genotyping results will be collected and analyzed We used Bioinformatic softwares (BLAST; Primer3) to choose the target region and to design primers and probes Results: We collected 664 uterine and cervical biopsies A set of 7 primers and probes were selected and will be screened to determine the best set Perspectives: We intend to increase our cohort size and to complete different needed experiments

49. Arabic language and the cognitive sciences challenges : Reading

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The present work aims to identify some points of divergence reported in the reading literature and to discuss them in the context of a new experimental paradigm Inspired by work on multi stable perception, the originality of the present paradigm lies in the recruitment of ambiguous Arabic percepts We based on the two alternative forced choice (2 AFC) and the rapid parallel presentation (RPVP) paradigms Four types of stimuli were used, correct sentences (Egypt built a dam/ , incorrect sentences (ball time elephant/ , lists of nonwords, correct sentences containing scrambled targets (he hurt his hand/) Results support parallel processing, primacy of semantics over phonology and suggest an interaction between syntactic and semantic levels in word recognition Ultimately, the present work will be invested to discuss some cognitive sciences issues

50. Exploring the Effects of Benzodiazepines on Platelet Function, Antimicrobial Activity, and Antidiabetic Potential

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Benzodiazepines have been widely used in clinical practice In our laboratory research, we investigated the effects of benzodiazepines on platelet function, antimicrobial activity and antidiabetic potential Our results revealed that benzodiazepines exhibited significant antiplatelet and antimicrobial effects Furthermore, benzodiazepines showed antimicrobial activity against certain microorganisms, suggesting a possible role in combating microbial infections However, we did not observe any significant antidiabetic effects of benzodiazepines in our study In conclusion, our findings suggest that benzodiazepines possess antiplatelet and antimicrobial properties, but do not exhibit antidiabetic effects Further research is warranted to elucidate the underlying mechanisms and potential clinical implications of these findings

51. Application of a Hybrid Planning Technique for Radiotherapy in Moroccan Breast Cancer Patients, Incorporating Supraclavicular and Axillary Lymph Nodes

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This study evaluates a hybrid planning technique for breast cancer radiotherapy, which combines two 3DCRT tangents for the breast and VMAT for the supraclavicular and axillary nodes The effectiveness of this technique is compared to using only 3DCRT or only VMAT The study utilized 20 CT datasets and prescribed a dose of 50 Gy in 25 fractions for all techniques Results show that the hybrid technique improves organs at risk

dosimetry for the heart, spinal cord, lungsand larynx while achieving better target dose coverage The study concludes that the hybrid planning technique is a promising option for breast cancer treatment

52. la borreliose au Maroc : etat de connaissances

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La borreliosepose un probleme de sante veterinaire au Maroc Le changement climatique, la desertification rurale, le surpaturage et la pollution sont parmi les facteurs qui influencent la distribution des tiques dans la faune sauvage, et par consequent, la contamination par des maladies dont la gravite depend de la nature de l agent pathogene qu elles transmettent Cette etude vise a identifier les differentes maladies transmises par les tiques chez les canides et leurs vecteurs au Maroc Methodes : Une etude bibliographique a ete realisee sur les articles concernant les maladies vectorielles transmises par les tiques chez les canides au Maroc Seules les etudes eligibles ayant fait l objet d une analyse approfondie et d un texte integral ont ete incluses Resultats : 30 etudes ont ete jugees eligibles pour notre revue systematique Conclusion : Les maladies vectorielles a tiques chez les canides au Maroc necessitent l adoption d un plan de lutte antivectorielle efficace

53. Synthesis and theoretical study of some benzimidazolones derivatives obtained by 1,3 dipolar cycloaddition reaction

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The aim of our work is to highlight new synthetic routes of benzimidazolone derivatives, which will be subjected to condensation reactions of the synthesized benzimidazolone dipolarophiles with different azides, in 1,3 dipolar cycloaddition reactions to prepare polyheterocyclic systems We will also perform a theoretical study (DFT) of the 1,3 dipolar cycloaddition reaction using quantum approaches, which will help explain the regioselectivity obtained The results are in agreement with the experimental data The cycloaddition products were identified by spectroscopic methods using infrared (IR), nuclear magnetic resonance (NMR) and possibly X ray (XRD) analysis

54. Evaluation of Size Specific Dose Estimates for Optimizing Abdomen CT Protocol in pediatric

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Abstract This is a retrospective and cross sectional analytical design study aimed to estimate the radiation exposure dose for pediatric patients undergoing abdomen CT examinations at morocco hospitals The importance of estimating patient sized adjusted radiation dose for pediatric computed tomography (CT) has long been accepted Our study aimed to evaluate the effectiveness of size specific dose estimate (SSDE) to compensate for the underestimated pediatric absorbed dose

55. Particle Therapy: Clinical Strategies and Biological Insights

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Particle therapy, which employs protons, neutrons, and carbon ions, is a form of external beam radiation treatment utilized for cancer treatment Its distinctive physical traits that reduce damage to normal tissues have generated considerable attention, unlike any other conventional treatment Particle beams are essential for tumors located close to critical structures due to their ability to administer radiation with precision This work explores recent investigations into the clinical use of particle therapy in cancer patients and reveals its biological effects Divided into two sections, it summarizes the clinical applications of particle therapies and tumor molecular responses after particle irradiation

Thematic 10

Biodiversity and Sustainable Ecosystem Management

1. A review of soil heavy metals pollution from mines in Morocco: implication for human health

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Mining in Morocco has economic benefits, but it poses environmental and health risks This study reviews heavy metal pollution in 14 mining sites from 2005 2021 It assesses the mean concentration and geo accumulation index (Igeo) levels of 7 heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn) Cd, Pb, Cu, and Zn were severely contaminated, with Zn, Pb, and Cr being the most concentrated metals in mining soils Health risks were evaluated for children and adults using Hazard Quotient (HQ), Hazard Index (HI), and Lifetime Cancer Risk (LCR) analysis Risks were higher for children, with non carcinogenic risks for Pb, Cd, As, Cu, and Zn and carcinogenic risk for Pb exceeding acceptable limits in most mining soils For adults, non carcinogenic risks for Pb and Cd exceeded acceptable limits in certain mining soils This study provides valuable background data on heavy metal pollution in Moroccan mining areas and the urgent need to protect the health of communities living near mining sites

2. Elimination of methylene blue by adsorption on biochar: kinetic, isothermal and thermodynamic studies

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In this work, we studied the adsorption of methylene blue (MB) on biochar in order to preserve the quantity and quality of aquatic resources To understand the biochar adsorption process, various parameters were explored and optimized, including the effect of pH, initial methylene blue (MB) concentration, adsorbent dose, temperature, and contact time The measured maximum adsorption capacity of methylene blue on the purification biochar was approximately qe = 83 33 mg/g at 60 min of contact time Kinetic, isothermal, and thermodynamic studies were carried out The Langmuir isotherm was found to best fit the experimental data over the entire concentration range, as indicated by the high values of the correlation coefficients (R2 gt; 0 999) However, the negative value of G indicates that the adsorption of methylene blue on the adsorbents is thermodynamically feasible and spontaneous

3. Determination of Acrylamide in potato chips commercialized in Morocco by high performance liquid chromatography-diode array detector (HPLC DAD)

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Heat has been used to cook food for thousands of years Thermal processing is critical for microbiological safety, nutritional quality, and desired sensory qualities such as color, texture, and flavor Yet, potentially unwanted toxic molecules have emerged as a result of food thermal processing, such as acrylamide (AA), which has received much scientific interest over the past few years This food contaminant has been detected in all types of foods, including cereal products as well as potato products prepared at high temperatures, and is formed when asparagine enters a Maillard reaction with reducing sugars such as glucose Among the foods with the highest concentrations of AA are potato chips In this work, a simple and rapid method was developed for the determination of AA in fifty six (n = 56) samples of potato chips commercialized in different markets in Rabat, Morocco

4. Enhancing Sulfadiazine Detection in Various Samples with Modified Carbon Electrodes: A Comprehensive Review

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Sulfadiazine is a type of broad spectrum antibiotic widely used in aquaculture, animal feed, and nutrition to prevent bacterial diseases However, its overuse has led to the accumulation of sulfadiazine in the environment and food products, which can pose health risks Therefore, there is a need for a monitoring system that can detect sulfadiazine with high sensitivity, ease of use, and low limit of detection This work proposes the use of electrochemical detection with a chemically modified carbon electrode for detecting sulfadiazine in various samples such as feed, pharmaceutics, milk, and urine

5. Optimisation de la valorisation des dechets de plastique et de sediments dans des liants recomposes : Activation Formulation de mortiers Stabilisation physico chimique

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Civil engineering consumes a sizeable amount of natural and non renewable resources, and also generates a lot of waste, such as those linked to the deconstruction of buildings One of the avenues to reduce the environmental impact of this field isto recycle industrial by products and waste in matrix of construction This work of thesis concerns the co valorization of two types of waste The first one is dredged sediments of fluvial nature, characterized by a very high content of organic elements and the existence of primary mineral phases The second one is residual waste coming from a valorization centre of waste plastic

6. Green Synthesis and Catalytic Activity of metal Nanoparticles Deposited on Expanded Vermiculite for the Chemoselective Reduction of organic pollutants

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Recently, developing affordable, easily prepared catalysts has gained importance due to the rising need for eco friendly, efficient solutions across industries This study focuses on the synthesis and characterization of a novel catalyst system using a wet chemical method, supported by a natural substrate named Vermiculite, a hydrous phyllosilicate mineral that has gained attention for its versatility and unique properties The adsorption

behavior of Vermiculite towards metal ions revealed an optimal adsorption at a pH 5 33 with an adsorption capacity of 22 58 mg g 1 And subsequent processing led to the formation of nanoparticles within the catalyst system The nanoparticles effectiveness in reducingpollutants highlights the potential of this novel catalyst system for environmental remediation The results of this study highlight the potential of Vermiculite as a promising additive for catalytic support, indicating strong adsorption capabilities, high cation exchange capacity

7. Un nouveau bioadsorbant durable pour l elimination de la toxicite dans les eaux uses

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Les auteurs proposent une etude globale du processus de pretraitement des eaux usees urbaines generees par la STEP d El Jadida afin d evaluer son efficacite Plusieurs parametres physico chimiques des eaux brutes et traitees ont ete investigues, notamment la temperature, le pH, la demande biochimique en oxygene (DBO5), la demande chimique en oxygene (DCO), les matieres en suspension (MES), etc Les analyses ont revele une evolution des rendements d epuration L analyse par spectroscopie d emission optique a plasma inductif a revele la presence des metaux lourds (ML) tels que Zn, Cd, Cr, etc Afin de reduire la presence des ML, un nouveau bioadsorbant rentable et durable a ete propose dans cette etude En effet, la plupart des ML tels que le Co, Be et Cu ont ete elimines alors que le taux de Cd, Pb, Cr, Mn, Al et Zn a ete reduit Par consequent, ce processus d adsorption serait d un grand interet pour fournir des eaux usees saines et pour etendre leur reutilisation dans l irrigation

8. Ecologically based rodent management in Africa

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There are 463 species of rodents on the African continent, 77 of which cause agricultural damage, and 12-20 of which are major crop pests For smallholder farmers, rodents pose an important risk to human health, animal loss, and food security Ecologically based rodent management (EBRM) is recommended as the way forward for rodent management in Africa EBRM relies on understanding the ecology of pest species and formulating this knowledge into management programs The major constraints for establishing EBRM in Africa include the absence of key studies on the taxonomy and ecology of rodents, lack of knowledge by farmers on available technologies, and unfavorable agricultural policies The development of EBRM and its success in Asia strongly encourage African scientists to develop similar management strategies for the most important pest species such as the multimammate rats

9. THE EFFECT OF BRINE DISCHARGE FROM DESALINATION PLANT DOUIRA AGADIR MOROCCO

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In Morocco experienced more than a decade of drought, conventional water resources talent inadequate to meet the needs of the population and agricultural, which prompted the Moroccan authority to seek other resources to ensure the drinking water supply of this population The most suitable solution and which does not depend on climatic hazards, was the desalination of sea water The desalination of sea water in Morocco has a strategic character: it will replace the natural resources in the majority of the southern cities of Morocco Whatever the process used, all the desalination stations produce important quantities of brine Desalination techniques can present an environmental

risk: the discharges of brine, hot water, and chemical products must not contaminate the ecosystem The most urgent issue is the management of these impacts, given the amount of investments for these projects

10. MXenes composites in water purification and environmental remediation

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Environmental pollution has accelerated and intensified because of the acceleration of industrialization, therefore fabricating excellent materials to remove hazardous pollutants has become inevitable MXenes as emerging transition metal nitrides, carbides or carbonitrides with high conductivity, hydrophilicity, excellent structural stability, and versatile surface chemistry, become ideal candidates for water purification and environmental remediation Particularly, MXenes reveal excellent sorption capability and efficient reduction performance for various contaminants of wastewater In this regard, a comprehensive understanding of the removal behaviors of MXene based nanomaterials is necessary to explain how they remove various pollutants in water The eliminate process of MXene based nanomaterials is collectively influenced by the physicochemical properties of the materials themselves and the chemical properties of different contaminants

11. Valorisation des boues d epuration : une innovation durable pour l elimination des polluants et la production de charbon actif

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La valorisation des boues d epuration est essentielle pour proteger l environnement et creer des opportunites economiques Dans cette etude, nous avons explore l utilisation de charbon actif produit a partir de boues d epuration pour eliminer un polluant modele, le bleu de methylene Le traitement a ete realise en plusieurs lots, et le charbon actif obtenu a ete analyse par diverses techniques Pour optimiser l elimination du bleu de methylene, plusieurs parametres ont ete etudies, notamment le pH, la concentration initiale, la dose d adsorbant, la temperature et le temps de contact Le pH s est avere crucial pour l adsorption, avec un pH optimal de 9,5 et une concentration optimale de charbon actif de 0,8 g/l La capacite d adsorption maximale etait d environ 45,57 mg/g apres 60 minutes de contact, et l isotherme de Langmuir correspondait le mieux aux donnees experimentales

12. Vertical flow constructed wetland system for domestic wastewater treatment

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Similarly to natural wetlands, constructed wetlands (CWs) are engineered systems that were first developed by Dr K the Seidel in Germany in the early 1960s and upgraded by Reinhold Kickuth as the Root Zone Method in the late 1960s and early 1970s CWs use natural material and processes to treat wastewater by removing pollutants in order to reuse the treated wastewater or discharge it safely in the natural environment Compared to conventional wastewater treatment processes such as membrane bioreactors or sequencing batch reactors, CW system is an eco friendly and cost effective treatment that uses no chemicals and requires low energy In addition, it is appropriate for remote areas, where conventional treatment is not possible and limited The present work aims to study the performances of vertical flow CW units to treat domestic wastewater of the region of Rabat, Morocco The results indicated significant removal rates of COD, BOD and TSS, reaching up 95% , 97% and 84% respectively

13. la detection des antibiotique par voie electrochimique

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Development of a new polymer/carbon electrochemical sensor on a glassy carbon electrode for the detection of tetracycline ABSTRACT A novel electrochemical sensor for the detection of Oxytetracycline was proposed based on immobilizing polymer/carbon quantum dots film on glassy carbon electrode Electrochemical impedance spectroscopy, cyclic voltammetry and amperommetry were utilized to confirm the successful stepwise assembly procedure of the sensor The elec trocatalytic behaviors of the sensor were also investigated by cyclic voltammetry and amperommetry Several parameters will be optimized such as the variation of the ph, the scan rate, the immobilization time, the concentration of the modifier added to the GCE

14. Electrochemical oxidation of organic pollutants in an aqueous solution using the anode of MnO2

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Traces of persistent organic pollutants, including pharmaceutical residues, cosmetics and dyes, are often found in aquatic environments These pollutants are not biodegradable and their removal by conventional means in conventional wastewater treatment plants remains unsatisfactory Electrochemestry is a promising method to be promoted in wastewater treatment plants for the removal of persistent organic pollutants In our study, we focused on the electrochemical oxidation of ana organic pollutant in an aqueous solution using the anode of MnO2

15. Analysis of Moroccan soil macronutrient';s using a novel method

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Smart farming is a type of precision agriculture (PA)aims to increase productivity while reducing resource consumption Macronutrients (N P K) are the most important nutrients in the soil for plant growth Macronutrient monitoring is essentially needed to optimize the amount of fertilizer required for a maximum yield As a result, many farmers rely on traditional chemical analysis to obtain this information, which is costly, time consuming, and resource intensive There is a high demand for the use of less expensive and more accurate sensors for those analyses One of the more affordable and miniaturized sensors is the ISFET (Ion selective field effect transistors) miniaturized electrochemical sensor, widely used in many fields This study presents the use of ISFET for the analysis of the macronutrients (N P K) in Moroccan soils and its laboratory test according to reference analysis Then, we conclude that we could employ ISFET as an alternative for macronutrient analysis

16. Activite catalytique de AgSn2(PO4)3 dans la reduction du 4 nitrophenol en 4 aminophenol

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Abstract : Dans cette etude, un materiau AgSn2(PO4)3 de type Nasicon a ete synthetise pour exploiter ses proprietes catalytiques Le borohydrure de sodium a ete utilise pour la generation in situ des nanoparticules d argent et pour la reduction du 4 nitrophenol en 4 aminophenol La presence des nanoparticules d argent ameliore l activite catalytique du materiau, reduisant considerablement le

temps de reaction a temperature ambiante L efficacite du materiau a ete evaluee en fonction de divers parametres tels que la concentration en catalyseur, la temperature et le temps de reaction Les resultats ont revele que l';AgSn2(PO4)3 est un catalyseur prometteur pour la reduction du 4 nitrophenol et d autres reactions similaires Ce materiau offre un potentiel significatif pour des applications environnementales et en chimie verte, telles que la depollution et la synthese de composes respectueux de l environnement

17. Air pollution monitoring systems based on Big Data and Internet of Things

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Air pollution is the most important environmental problem in the world and is a major health and environmental hazard, affecting our daily activities and quality of life The development of industrial activities is one of the main reasons for the urgency of air monitoring It allows for a thorough analysis, supervision, and control of the operations of a system or process in real time To mitigate the challenges of air pollution, a large number of Internet of Things related technologies have been developed to assess and monitor various air quality parameters Using traditional laboratory analysis or installing large, expensive models every few miles is no longer effective Smart devices are needed to collect and analyze air data Air quality depends on many factors, including location, traffic, and weather conditions This study focuses on monitoring weather conditions from an automatic wireless weather station for air quality performance evaluation based on an intelligent system

18. synthese et valorisation d';argiles pour l';elimination des micropolluants dans le traitement des eaux

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La preparation d';argiles et l';evaluation de leurs opportunites, capacites d adsorption et des defis potentiels pour leur application pour l';elimination de micropolluants dans le traitement des eaux sous terraines ou de surface Afin de mieux predire les conditions experimentales optimales, l';interaction matrice materiau fera l';objet d';une modelisation

19. A state of the art on the use of recycled solid waste future application

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The growth of urbanization and population contributes to an increase in waste production, which leads to severe environmental concerns This phenomenon represents a real problem for the human and especially for the nature because of their stability and their low biodegradability One of the preferred ways is to develop appropriate uses for industrial waste in different sectors of engineering and material fabrication in the field of civil engineering in order to create a more ecological world In this context, the construction industry should take a broader view of recycling and waste management This review presents a brief discussion of the benefits of recycling solid wastes such as fly ash, silica fume, copper slag, rubber tires, etc for incorporation into construction materials The valorization of solid wastes preserves natural resources, decreases water pollution, reduces greenhouse gas and saves the cost of construction materials

20. Huile essentielle de la sciure de Cedrus atlantica comme inhibiteur ecologique contre la corrosion de l acier doux dans une solution de HCl 1M

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L efficacite d inhibition de l huile essentielle de la sciure de bois de C atlantica contre la corrosion de l acier doux dans une solution de HCl 1M a ete testee en utilisant la spectroscopie d impedance electrochimique et la polarisation potentiodynamique Les mesures de polarisation ont revele un comportement inhibiteur de type cathodique L efficacite inhibitrice evaluee par les deux techniques de polarisation etait en accord typique, avec des valeurs de 95,09 % et 95,82% a 250 ppm de l huile essentielle Sur la base des proprietes cinetiques et thermodynamiques, il est conclu que l adsorption de l huile essentielle de C atlantica se produit via un processus de physisorption et suit l isotherme de Langmuir L effet de l inhibition de la corrosion a ete decouvert pour etre dependant de la temperature et de la concentration de l inhibiteur

21. Contribution of Multivariate Analysis to the In Vitro Dissolution Profile for Testing Clopidogrel Drugs Similarity

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A novel approach to test the similarity of clopidogrel batches by comparing drug dissolution profiles, based on the combination of principal component analysis with hierarchical cluster analysis (PCA HCA), is presented Dissolution curves corresponding to five brands of clopidogrel drugs, taken as model drugs, were prepared by measuring the dissolution rate in pH 1 2, 4 5, and 6 8) The dissolution data were analyzed by similarity factor (f2) calculation and the PCA HCA method, and the results were compared Unlike the f2 test, the PCA HCA approach reflects the variability inside the individual dissolution patterns, which it is also sensitive to profile variations (form and size) The comparison between the PCA HCA results with those of f2 tests gives approximately similar results, knowing that PCA HCA represents, in general, a more discriminative criterion

22. La contribution de l enseignement de l energie au developpement durable : etat des lieux et perspectives revue de litterature

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L enseignement de l energie peut jouer un role important dans la realisation des objectifs de developpement durable lies a l energie Les etudes montrent que l education a l energie peut aider a sensibiliser les eleves aux enjeux environnementaux et a promouvoir des comportements energetiques durables Cependant, il y a des defis tels que le developpement de materiel didactique approprie, l approche interdisciplinaire et le soutien des politiques educatives qui doivent etre releves pour que l enseignement de l energie soit efficace Les enseignants ont besoin d un soutien continu pour developper leurs competences en matiere d enseignement de l energie et pour adapter leur pratique pedagogique en fonction des contextes locaux et des besoins des eleves Enfin, il est important de mesurer l impact des programmes educatifs sur les comportements des eleves pour evaluer leur efficacite et pour identifier les meilleures pratiques en matiere d enseignement de l energie

23. Chitosan nanoparticle fertilizer (NPK) and spent coffee grounds (SCG) mixture as an organic amendment on soil fertility and coriander growth in agricultural soils

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The use of spent coffee grounds (SCG) as an organic amendment has several implications for agriculture and the environment It enhances soil organic carbon OC (10% protein), reused, and eliminates a significant quantity of coffee waste A novel method for using SCG as a liquid solution was examined in this paper Thus, the purpose of this

study is to assess the fertility of the soil and the development of coriander as a plant when amended with Chitosan nanoparticle fertilizer (NPK), Spent coffee ground, and the mixture of NPK: SCG The chitosan nanoparticles fertilizer was obtained by dropping di ammonium hydrogen orthophosphate (DAHP) in chitosan (CS) UV visible spectroscopy was used to examine the optical properties of the biopolymer The plant growth factors, as well as the physicochemical soil qualities, have been studied

24. Thermodynamic properties data of ternary system NH4H2P04 electrolyte water : Water activity, osmotic coefficient, activity coefficient, excess Gibbs energy at 298 15 K

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The mixed aqueous electrolyte system NH4H2PO4 electrolyte Eau been studied with the hygrometric method at the temperature 298 15 K The water activities, osmotic coefficient are deduced from measurements of relative humidities of this system against total molality to about saturation Experimental results are compared to Dinane rule by the Extended Compound Additivity Law (ECA), Leitzke Stoughton (LS Il) and Lin et al equation The obtained results were correlated using the PSC model to predict the solute activity coefficients in the mixture for different compositions of the system and are also used to calculate excess Gibbs energy in the studied molality range

25. New thermodynamic data of mixed phosphate and electrolyte : Water activity, osmotic coefficient, activity coefficient, excess Gibbs energy at 298 15 K

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The hygrometric method was used to determine the thermodynamic properties and relative humidities of a ternary mixed electrolyte system consisting of (Phosphate Electrolyte H2O) The measurements were taken at 298 15K, from dilution to saturation, for both the phosphate and electrolyte at different ionic strength fractions (y) Based on the data obtained, the water activity and osmotic coefficient were experimentally deduced The experimental results were then compared with predictions made using the compound additivity law (ECA), Leitrke Stoughton (LS II), and Robinson & Stokes model The obtained results were correlated using the PSC model to predict the solute activity coefficients in the mixture for different compositions of the system In addition, excess Gibbs energy was calculated for this system

26. Olive Mill Wastes Management

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In spite of the economic importance of olive oil production, there is no doubt that it harms the environment Thereby, to better mitigate any negative impacts, and to make environmentally responsible decisions, it is essential to adopt thelife cycle assessment (LCA) The analysis showed that it is possible to eliminate the high environmental pressures by treating the by products of the olive oil production process and using them as raw materials to produce fertilizers or composting products The Mediterranean region s agricultural soils are progressively deteriorating due to excessive exploitation and climate change However, utilizing co composted olive mill wastes as an amendment for Mediterranean soils presents an environmentally friendly solution that can alleviate the negative environmental effects and enhance soil health

27. Effect of Kaolin clay and Ficus carica mediated silver nanoparticles on chitosan food packaging film for fresh apple slice preservation

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In this work, a novel antioxidant, antibacterial, and biodegradable food packaging film was elaborated, by incorporating natural kaolin clay (KC) and Ficus carica mediated silver nanoparticles (AgNPs) into Chitosan (Cht) A comparison of the physico chemical and functional characteristics of the Cht/KC/AgNPs film was performed with those of Cht, Cht/KC, and Cht/AgNPs SEM analysis showed a rough surface in the composite films containing KC particles because of their large diameter (50-120 m) compared to AgNPs (20-80 nm) The FTIR analysis suggested that the interactions between Cht and AgNPs were stronger than those between Cht and KC The tensile strength of Cht film increased from 16 MPa to 24 MPa in Cht/KC/AgNPs film The introduction of KC and/or AgNPs considerably improved the light and moisture barrier capacity of the Cht film The UV light transmittance decreased by 50 % for Cht film when incorporated by KC and AgNPs

28. Study of the purification performance of a bio filter for the treatment of water from aquaculture

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This study aims to evaluate the purification performance of a bio filter used to treat water from aquaculture for reuse in the same practice The filter was fed with aquaculture water with the following hydraulic load rates 500, 1000 and 2000 L/m2/d The nitrate reduction rate is 100% For orthophosphates, the reduction rate is also 100% for HLR=1000 L/m2/d and greater than 96% for 500 and 2000 L/m2/d in HLR Total nitrogen is eliminated at 89 13% for the HLR=500 L/m2/d, 81 81% for the HLR=1000 L/m2/d and 84 04% for the HLR=2000 L/m2/d The turbidity reduction was greater than 94% for a HLR=500 and 1000 L/m2/d COD reduction remains average and does not exceed 52%

29. Sewage sludge valorization

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Large amounts of sludge are produced during biological wastewater treatment, and both their volume and manner of valorization continue to pose environmental issues, from which they must be managed effectively to satisfy the strict laws and legislation There are various ways for reusing sewage sludge, although there are too several limitations on how the management approach may be used A study done from a synthesis of articles and publications treating the different ways of sewage sludge valorization available at present and the constraints related to this valorization shows that sewage sludge can be reused under certain conditions, especially when the reuse is in direct or indirect contact with humans (use in agriculture), because of the content of harmful elements (pathogens and/or heavy metals) in the sludge and inexistence of studies proving the absence of any long term risk to human health and environment

30. Efficient removal of pharmaceutical compoundsfrom aqueous solutions using a low cost adsorbent: kinetics and isotherms modeling

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Pharmaceutical compounds belong to the class of contaminants that have been identified in low concentrations in the environment and that can negatively affect human health and/or ecosystems The objectives of this studyis to examine a cost effective adsorbant for the depollution of contaminated water The low cost adsorbent were firstly prepared, characterized, and applied for efficient removal of antibiotic levofloxacin and keto-

tifen fumarate in wastewater In addition, the influence of various adsorption parameters such as shaking time, composite dosage, solution pH, presence of co anions and temperature for the removal of antibiotic molecules were determined The adsorption mechanism, isotherm, kinetic, and thermodynamic parameters were also investigated

31. The assessment of water resources in the Tensift Basin for an integrated management in the face of climate change

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The assessment of the individual terms of the hydrological budget at the scale of a drainage basin is one of the most important aspects of water resources management, particularly in the regions This evaluation focuses on the area of Marrakech, part of the Tensift basin, which is marked by a lowering of the piezometric level as well as a high rate of nitrates in the water of the wells taken It uses the modeling software MODFLOW with which, after the elaboration of the conceptual model, the hydrogeological flow mode is built in constant regime as well as in transient regime in order to validate the sensitivity test of the aquifer New water sampling will be performed in the wells in the area and will be analyzed to define the origin of the water quality contaminants The water dispersal model will be constructed after the sensitivity test has been validated The simulation of the management scenarios will be done in the last step of the work

32. Treatment of wastewater containing dyes by adsorption using an organic waste

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The excessive demand for water observed in several domains (domestic, agricultural and industrial) generates enormous quantities of water loaded with organic and inorganic pollutants that are not or hardly biodegradable The production of these effluents is not without consequences on human health, fauna and flora To reduce the effects of these contaminants, many wastewater treatment processes are being developed, in particular the adsorption technique In this work, we study the adsorption in aqueous medium of an organic dye, Methylene Blue (MB), on an organic waste The plant support was previously characterized A series of experiments was then carried out in order to study the influence of various operating conditions on the adsorption capacity All the results obtained show that the cationic dye "Methylene Blue" adsorbs better Different parameters such as pH, contact time, stirring speed, concentration were carried out

33. La phytoepuration par les lentilles d';eau et valorisation

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Nous avons choisi de mener une etude sur la phytoremediation comme pratique respectueuse de l';environnement sur une station pilote de lagunage aere a macrophytes, situee a (ONEE Branche Eau) Le lagunage certes reste un procede non complexe, a faible cout puisqu';il s';agit d';un traitement biologique effectue par des bacteries Pour optimiser le temps de sejour nous avons choisi la lentille d';eau comme plante aquatique epuratrice ideale, non seulement pour sa capacite d';absorption des metaux lourds mais aussi pour sa petite taille et sa capacite de se reproduire en 2 a 5 jours uniquement On a aussi pu tester la capacite epuratoire de cette plante par adsorption sur le colorant CI Reactive Blue 203 en etat de dechet (en poudre) et la valoriser en developpant un biomateriau 100% vegetale alternatif au charbon actif

34. Procede electrochimique d';oxydation avancee Electro Fenton: application a la degradation/ mineralisation/ biodegradabilite de l';antibiotique CFX Na en milieux aqueux

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Ce travail a pour objectif d';etudier, d';une part, l';efficacite du procede Electro Fenton pour la degradation et la mineralisation de l';antibiotique CFX Na en milieu aqueux tout en examinant les conditions optimales des differents parametres influencant son efficacite, d';autre part, la faisabilite d';un eventuel couplage du procede Electro Fenton avec un procede biologique en testant l';evolution de la biodegradabilite des solutions par des mesures du rapport DBO5/DCO avant et apres les electrolyses Les resultats obtenus ont confirmes que le procede EF est tres efficace pour degrader /mineraliser ce contaminant antibiotique De plus, une augmentation du rapport DBO5/COD de 0 au traitement jusqu';a 0 4 obtenue apres 2 heures d';electrolyse, confirme la biodegradabilite de la solution electrolysee et par consequent l';interet d';un eventuel couplage des deux procedes

35. Production and characterization of rectangular cellulose nanocrystals (type II) from nutshells: argan nutshells (ANS) as a case study

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The shells of tree important food nuts and the relevance of valorizing nutshells are growing The potential value of argan nutshells (ANS), which are one of the primary byproducts of the argan oil industry and are wasted to the tune of approximately 60,000 tons each year, has received attention in research related to the same industry This paper suggests using argan nutshells particles rich in nematic ordered cellulose for producing cellulose nanocrystals (CNC II) with a rectangular shape via the chains self assembly in acid hydrolysis that is useful in many felds of applications In the experimental results, the chemical composition of ANS was described; moreover, the morphologies of ANS after each chemical treatment were studied

36. Production of green hydrogen employing proton exchange membrane water electrolyzer : Characterization of electrolyte membrane A critical review

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Abstract In the framework of developing renewable energies and reducing greenhouse gas emissions, green hydrogen has become a crucial factor in the energy revolution This energy vector can be manufactured from biomass, biogas reforming or by splitting water, which is one of the most abundant and limitless power generators on earth Proton exchange membrane water electrolysis (PEMWE) has gained considerable attention as an energy conversion system for hydrogen production It is considered the preferred choice for green hydrogen production owing to its energy efficiency, low capital cost, flexibility, safety, and durability This work represents the operation of the cell of the water electrolyzer

37. Chromochloris Zofingiensis for Wastewater Treatment and Bioenergy Production

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One of the most promising sources of alternative bioenergy has been thought to be microalgae However, in order to mass cultivate microalgae for the manufacture of bioenergy, high efficiency production meth-

ods must be developed In the current work, it is suggested to employ various concentrations of whey wastewater (10% , 20% , 50% and 100%) as substrate of Chromochloris zofingiensis to assess nutrient loading and lipid content After 7 days of cultivation, 10% of whey wastewater was demonstrated to be more suitable medium for Chromochloris zofingiensis biomass and lipid production than others dilutions The strain can remove nitrate, total nitrogen, phosphate, total carbon, chemical oxygen demand and lactose from 10% of whey wastewater about 72 53% , 83 13% , 89 09% , 69 50% , 82,55 and 79 13% respectively

38. An ab initio study of the photodissociation of acetaldehyde

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The photodissociation of the atmospherically relevant acetaldehyde molecule have been studied experimentally and theoretically In this work, the photodissociation of acetaldehyde through pathways: CH3CHO + hv CH3CO+ H, and CH3CHO + hv CH2CHO+ H, is studied by means of high level ab initio calculations (at MRCI level of theory) Potential energy curves (PECs) along the corresponding dissociating bond distance associated with the ground and several excited electronic states involved in the above fragmentation pathways, as well as the nonadiabatic couplings connecting the different states, are obtained The potential surfaces and couplings reported for the present set of electronic states allow for the first complete description of the above photodissociation process

39. Valorisation des dechets industriels

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40. Recovery of red wood and beech wood waste Contribution to the protection of the environment

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Industrial wood waste has always posed an environmental problem Indeed, they are largely reused in the energy field by simple combustion, thus generating a quantity

considerable amount of carbon dioxide, the number one enemy of the environment

The objective of this thesis is to contribute to the protection of the environment by promoting two types

of industrial wood waste (Red Wood and Beech Wood) by studying the adsorption of some effluents

harmful to its waste

Industrial waste was collected from a local industry in Fez in order to chemically treat it to extract cellulose, this waste and the paste obtained are characterized by infrared spectroscopy (FTIR), scanning electron microscopy (SEM), ray diffraction X (DRX) and X ray fluorescence (FX), thus making it possible to identify the various components of the wood and to follow the change brought to these compounds during and after treatment

41. Modelisation d une station de dessalement par osmose inverse

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The world';s need for clean water is suffering by population growth, industrialization, and climate change, 2 5 billion people could suffer from water shortage in 2050 due to the evolution of demography and the increase of water consumption To face this announced water shortage, new techniques of drinking water production will have to be set up to satisfy the needs of the growing population Sea water Desalination by reverse osmo-

sis is being used more and more around the world to provide people with needed fresh water Reverse osmosis is a process for separating water and dissolved salts by means of semi permeable membranes under the action of pressure The desalination of sea water by reverse osmosis is a current option adopted by the Moroccan government to cope with the drying up of water resources Multiple stations are launched in the region most affected by drought, others are planned to cover the need for water

42. Valorisation des boues dans la fabrication des materiaux de construction

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La valorisation des boues d eau potable dans les materiaux de construction est une pratique qui presente plusieurs avantages environnementaux, economiques et sociaux Les boues d eau potable, qui sont generalement considerees comme un dechet, peuvent etre transformees en ressource utile pour la fabrication de differents types de materiaux de construction Cette pratique permet de reduire la quantite de dechets generes lors du traitement de l eau potable, de reduire la consommation de matieres premieres et de creer une ressource a faible cout Cependant, la valorisation des boues d eau potable dans les materiaux de construction necessite une analyse approfondie de la composition des boues et des exigences techniques des materiaux de construction Ce poster presente les avantages et les defis de la valorisation des boues d eau potable dans les materiaux de construction ce qui peut contribuer a la durabilite de l industrie de la construction

43. Oued Ykem watershed: Environmental degradation and water pollution

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The present subject proposes to study the Oued Ykem watershed, which is because of its good hydro climatic characteristics and especially its geographical location, it is solicited by three areas that contribute to the deterioration of its waters: urbanism, agriculture and industry The work carried out has as objective the study of the environmental degradation and particularly the water pollution at the level of the Oued Ykem watershed, based on a method of data analysis "SWOT" which allowed to determine the critical areas of pollution and which require a control and a setting of fast, durable and innovative actions, in order to preserve the quality of the existing hydraulic potential in Oued Ykem

44. Treatment of Olive Oil Mill Wastewater by Adsorption via Natural Adsorbants

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Olive oil mill wastewater (OMW) is a typical by product of olive oil production, constituting a major environmental issue in many countries, due to its acidity and the important quantity of organic matter and polyphenols In Morocco, OMW is commonly discharged into the soil and aquatic environments due to deficient regulations Several techniques are adopted to recover phenols from OMW Adsorption is considered the most efficient, especially with the use of natural adsorbents from food industry by products The objective of this study is to carry out the treatment of OMW using the following naturals adsorbents : rice husks, coffee grounds, tea grounds, olive stones and mussel shells The results obtained were satisfactory which allowed to opt for a combination between the adsorbents to have a double adsorption This study may allow us to combine the most efficient adsorbents in an experimental design in order to carry out an adequate treatment of these wastewaters

45. La mise en place d un systeme de management integre au sein d un etablissement de sante

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46. Correlation between adsorption and photocatalytic activity of TiO2 of both cationic and anionic dyes in the presence of synthesized TiO2

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Photocatalytic decoloration of A Y and C V by using TiO2 nanoparticle synthesized in aqueous solution was studied under visible light The prepared photocatalyst was characterized by XRD, BEM, FTIR, EDX, UV Vis and photocalytic activity Its photocatalytic degradation effect was observed in the cationic (C V) and anionic (A Y) dye solution The results of photocatalytic degradation showed that the cationic pollutant degrades rapidly in basic medium at an optimum concentration of 10 ppm in the presence of a mass of TiO2 (m=0 1g) with a yield of 94 14% for 30 min, and for the anionic pollutant reaches a yield of 92 90% after a time of 60 min in acidic medium at a concentration of 30 ppm with a mass of 0 1g

47. Experimental and Mathematical Modelling of Reverse Osmosis System to investigate the impact of Feed Water Pressure: a case study

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The reverse osmosis (RO) system has become the most widely used technique over the past six decades to desalinate brine and make saline water potable This paper presents an experimental and modelled installation of a pilot RO system to control the impact of feed water pressure on various thermodynamic parameters of borehole water collected from Ain El Atti, Errachidia, Morocco Initial tests to verify the water quality confirmed the presence of a large number of dissolved salts in the borehole water The experimental set up was installed at the LPHE MS laboratory of the Faculty of Sciences of Rabat The study investigated the impact of feed water pressure on permeate parameters including salinity, flow rate, specific energy consumption, recovery rate and retention rate The results showed a mixed impact of feed pressure on all parameters In addition, the results also showed that the simulation model had high validity of results with the experimental results

48. etude comparative des plantes utilisees a la phytoepuration et Faisabilite de les combiner avec d autres systemes de traitement

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le traitement des eaux usees par la phytoepuration : etude comparative dans laquelle je vais tester l';effet epuratoire de deux plantes avec un changement des types de substrats utilises comme supports de la plante, aussi les performances du procede en le agencant avecd';autre systemes a toute fin utile, et l';etude degre de la depollution par la phytoepuration pour les metaux lourds

49. Cartographie et analyse de la qualite de l eau d irrigation dans la region cotiere de Skhirat, Maroc

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Cette etude analyse la qualite car-

tographique de l eau d irrigation dans la region de Skhirat, au Maroc Cette etude comprend l evaluation de la qualite physico chimique de l eau d irrigation a l aide des diagrammes Piper et ULSS et de la cartographie spatiale a l aide du SIG Les resultats ont montre un pouvoir de salinisation significatif et ont demontre que les classes de salinite et d alcalinite de l eau d irrigation dominantes dans la region sont C3 S1 (c " exclure les plantes sensibles et les sols lourds ") et C4 S2 (c est a dire de mauvaise qualite ; " a utiliser avec beaucoup de precautions, uniquement dans les sols legers ") L evaluation du diagramme de Piper determine deux facies hydrochimiques La carte bathymetrique indique un niveau peu profond en aval et Sud Ouest La carte de salinite montre une forte salinite en aval et en amont En conclusion, une degradation tres alarmante de l eau en termes de salinite est constatee dans la region

50. IMPACT OF THE DRAA BASIN WATER QUALITY ON DRINKING WATER SUPPLY, IRRIGATION AND SOIL (South East Morocco)

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The Oued Draa watershed extends from the Central High Atlas Mountains from the flank to the south The Draa basin is experiencing problems related to water and soil: Quality: Degradation of water quality Quantity, Management and Opportunity: overexploitation of water resources And other problems related to intensive human activities have caused contamination of surface water quality and groundwater that consequently affects human health The study of this region is important because of the overexploitation of its groundwater in recent years

The objectives of this thesis :

to make a physico chemical characterization of the waters of the alluvial aquifers of the high and medium draa Hydrogeochemical characterization of the waters of the high and medium draa (south east Morocco) To study the physicochemical and bacteriological composition of the surface waters of the Draa basin and to have The results obtained using the Moroccan grid of the evaluation

51. Water Quality Monitoring System for a Smart Environment

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Water is the most important resource that needs to be preserved Due to the many sources of pollution, water management has become very essential, in particular with the increasing demands for water in the agricultural, industrial and other fields To ensure the security of the water supply, quality must be carefully monitored and maintained in real time The values of water parameters are not stable but change continuously over time, as well as the problem of availability of informations at any time and place With the integration of the wireless sensor network technology (WSN) based on the Internet of Things (IoT), we have designed an intelligent water monitoring system that can collect five water parameters in real time at high speed from multiple different sensor nodes The collected values are sent to a computer database that is connected to the platform that can process the values received The results of the first tests give very interesting values for all the parameters tested

52. la mise en place d un systeme de management integre au sein d un etablissement de sante

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Hospital conditions hinder successful and sustainable quality assurance in public hospitals Accreditation and registration systems are difficult to implement due to specificities of public health care systems Quality

procedures have limited impact on organizational restructuring and developing a culture of quality The study aims to identify quality constraints and program deficiencies in the public sector, including hospitals Constraints include serving the population equally, lacking an adapted statutory framework, divergent stakeholder views, and financial constraints

53. STUDY OF THE KINETICS AND THERMODYNAMICS OF THE ADSORPTION OF A BASIC DYE ON A LOW COST ADSORBENT

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Textile industry dyes are a common source of pollution in surface and ground waters Many textile industry dyes are known to have adverse effects on public health, are capable of causing harm to plant and aquatic species, and result in colouration of the water body and connected environment [1] A number of water purification techniques are currently attracting significant research attention in efforts to remove dye contaminants from water These include adsorption The aim of this work is to investigate the removal of yellow basic 28 from aqueous solution by a low cost adsorbent Various influencing parameters such as solution pH, shaking time, initial dye concentration and adsorbent dosage were evaluated The kinetics, isotherms and thermodynamics of the adsorption process has been described References [1] M James and al , Influence of flake size and electrolyte conditions on graphene oxide adsorption of ionic dyes, Powder Technology,421 (2023)

54. Pour une education a l energie durable dans le cycle d';enseignement primaire au Maroc : enjeux et perspectives

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Dans cette etude, nous examinons l education a l energie durable dans les ecoles primaires marocaines Nous avons mene une analyse documentaire et une enquete aupres des enseignants pour comprendre les enjeux et les perspectives pour ameliorer l enseignement de cette matiere Les analyses montrent que l education a l energie durable est cruciale pour le developpement durable du Maroc, mais elle rencontre des defis importants tels que le manque de ressources educatives et de formation pour les enseignants, ainsi que son integration insuffisante dans le programme scolaire Les enseignants, conscients de son importance, manquent de temps et de ressources pour l enseigner Pour ameliorer cet enseignement, il est essentiel de developper des ressources educatives, d integrer cette matiere efficacement dans le programme scolaire et de former les enseignants

55. AN OVERVIEW OF HETEROGENEOUS PHOTOCATALYSIS APPLICATIONS FOR THE WATER TREATMENT

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Water resources are being depleted as a result of rising demand and water pollution caused by the introduction of micropollutants into natural water cycles Diverse strategies must be implemented to reduce the risk of water scarcity One alternative option is to use photocatalytic reactions in heterogeneous phases, which are simple, sanitary, and inexpensive As a result of a semiconductor receiving solar energy, these activities entail the transmission of an electron that breaks down contaminants Although titanium dioxide is widely used, its limited photocatalytic activity due to being activated only by UV light poses a difficulty This scientific overview underlines the importance of communicating relevant information about this technology, as well as the promise of photocatalytic technology to address wastewater treatment and water scarcity challenges

56. amoxicilin detection based on modified carbon electrodes

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A new sensitive and selective electrochemical method has been developed for detecting amoxicillin (AMX) using a graphite electrode modified with a nanomaterial Electrochemical sensors based on modified graphite electrodes are effective for detecting antibiotics, enabling the rapid control of their spread in the environment and protecting human health from potential contamination This study aims to present examples of new chemical and electrochemical sensors recently developed, as well as their practical application areas for the sensitive detection of amoxicillin in various matrices

57. Upgrading of a raw waste coffee grounds product for the treatment of Zn adsorption in wastewater effluents

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Heavy metal pollution has become an urgent environmental problem Removal of these metals from the environment is of considerable concern because of their effects In this study, we used wastewater to evaluate the adsorption properties of Zn using the raw coffee grounds derivative We performed characterization to determine the physicochemical properties of the adsorbent As a result, the results indicated that the pseudo second order model and all isothermal models were the most suitable to describe the Zn (II) adsorption system The high adsorption capacity of about 300 51 mol/g with the abatement of 92%

58. Elaboration et optimisation d un gel ionique de Chitosan incorpore a la margine pour une application pharmaceutique ou cosmetique potentielle

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Un hydrogel a base de chitosane et d argile a ete prepare et le temps de gelification a ete module en fonction de la concentration d acide acetique et celle du chitosane et de l argile Le plan de Box Behnken (BBD) a trois niveaux et a trois variables a ete realise pour optimiser les parametres selectionnes D autre part, l approche statistique (RSM) a ete demontree pour minimiser le temps de gelification de l hydrogel tout en optimisant les facteurs selectionnes, et pour ameliorer les conditions de preparation

59. Recycling End of life vehicules in Morocco

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The Moroccan automotive industry is experiencing relative growth each year and is considered the largest manufacturer of passenger cars in Africa Waste generation, particularly from end of life vehicles will increase as a result of this growth Each year, millions of tonnes of waste are generated from the disposal of cars which needs to be managed properly When a car reaches its end of life, it requires special handling, dismantling and disposal in the least environmentally harmful way possible There is therefore a strong need for reverse logistics networks that optimize the entire supply chain by covering the recovery of used components, efficient recycling of materials and disposal of hazardous and non recyclable waste This paper presents a mathematical programming model that minimizes the total cost of processing different types of ELVs as well as the revenues This model enables the determination of optimal facility lo-

cations and material flows in the reverse logistics network

60. Characterization of activated carbons prepared from low cost material and tested by methylene blue adsorption from aqueous solution

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This study approaches the characterization of activated carbons (ACs) from a low cost material using acidic and basic solutions as activating agents The objective of this study is to elucidate the achievability of chemical activation as a pathway to obtain two types of ACs The two activated carbons are obtained by acidic (ACa) and basic (ACb) activation The products obtained are characterized by different physico chemical analyses: point of zero charges pHpzc, specific surface by the methylene blue method and Fourier transform infrared spectroscopy (FTIR) In the case of these activated carbons prepared by acid and base, a kinetic test of adsorption of methylene blue (MB) is also approached The mode of activation seems to influence unequally the different physicochemical characteristics of the two activated carbons obtained The kinetics of MB adsorption by the ACa showed better adsorption compared to ACb

61. Modelisation statistique et analyse du comportement dynamique d';un systeme d';electrolyse PEM soumis a des sources intermittentes

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Aujourd';hui, l';hydrogene joue un role primordial pour stocker de l';energie electrique issu des energies renouvelables Cependant, 90% de l';hydrogene dans le monde est produit en utilisant des hydrocarbures fossiles Pour obtenir un hydrogene propre, il sera necessaire de le produire par l';electrolyse de l';eau Dans ce contexte, notre these de doctorat s';est focalisee sur une demarche globale qui permet de modeliser un systeme de production d';hydrogene par l';utilisation d';une chaine autonome complete de production a base de nouvelles technologies vertes

62. Effect of biochar amendment on soil structure and growth parameters of peas

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In order to find a sustainable solution to improve the fertility status of agricultural soils in Morocco, the application of Biochar as a soil conditioner / soil amendment to improve the physico chemical properties of the soil (Soil structure and availability nutrients) has been identified as a potential solution Biochar was prepared in this study from agricultural waste using a low cost production technique suitable for adoption by farmers This work presents the effects of application of this biochar on soil structure and growth parameters of pea (after 60 days of application)

63. Study of the adsorption of a basic dye (BB41) on a new biomaterial

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Aqueous effluents loaded with dyes and heavy metals from various industries are important sources of continuous water pollution The dye industry today produces huge quantities of dye materials These effluents can be treated with conventional physico chemical separation processes such as adsorption, reverse osmosis, ion exchange, coagulation, precipitation and oxidation Adsorption is one of the most used techniques in the field of

wastewater treatment The objective of our work is to eliminate an organic pollutant (basic dye BB41) by the adsorption technique on a support prepared from a vegetable biomass The effect of the contact time, the initial concentration of the adsorbate, the pH, the temperature and the dose of the adsorbent on the adsorption capacity are experimentally verified A kinetic and thermodynamic study of the adsorption phenomenon are also addressed

64. Antihypertensive and vasorelaxant activities of Hammada scoparia on vascular contractility mainly through calcium channels blockade pathway on Rat Aorta

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This study aimed to evaluate the antihypertensive effect of Hammada scoparia (H scoparia) in hypertensive rats, and to evaluate its probable vasorelaxant activity The aqueous extract of scoparia (AEHS) was prepared and used to investigate its antihypertensive ability in L NAME(N L arginine methyl ester) induced hypertensive rats, and its vasorelaxant activity was studied on the isolated thoracic aorta of rats The acute and subchronic effects of (AEHS) on blood pressure parameters were evaluated after oral administration of AEHS (60 and 100 mg/kg body weight) for 6 h for the acute experiment and for 7 days for the subchronic test The results indicated that AEHS decreased blood pressure parameters (systolic, mean, and diastolic blood pressure) after repeated oral administration in hypertensive rats without affecting normal rats This effect was partially decreased in the presence of nifedipine, by inhibition of the vascular calcium channel pathway in isolated rat thoracic aorta

65. Comparison of two semiconductors (P25) and (UV100) for the photodegradation of textile blue dye

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Heterogeneous photocatalysis is an increasingly used method to decontaminate polluted waters The photodegradation of the blue dye The commercial photocatalyst tested in this study is (P25) and (UV 100) for comparison The results obtained allowed us to show that TiO2 (P25) is more active compared to TiO2 (UV100) catalysts, for the adsorption and photodegradation of blue dye The total adsorptiontime of this pollutant in solution is after 15 min of irradiation only in the presence of TiO2 (P25) While with TiO2 (UV100), this time is respectively 60min The photocatalytic degradation kinetics was modeled by the Langmuir equation, by which the rate constant k and the adsorption equilibrium constant KLH were evaluated TiO2 (P25) showed better photocatalytic ability compared to that of TiO2 (UV100) for the degradation of blue dye (40 ppm) These results show that photocatalysis is a very suitable technique for the purification of waters containing blue dye

66. Numerical optimization study of silicon based cell for photoelectrochemical wastewater treatment

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Photoelectrochemical cells are used in multiples applications and known to be efficient in wastewater treatment driven by solar energy, a renewable and sustainable energy source The aim of this work is to simulate different semiconducting materials in order to define the optimal material structure and parameters such as the thickness and charge carrier density of each layer The cell performance, namely the shortcut current density Jsc and the efficiency has been optimized by investigating the effect of thickness and doping concentration of each layer while setting the rest of the parameters constant It was found that the overall cell performance is enhanced by high doping concentrations while it was reduced in some other cases Further work will focus on the experimental proce-

dures allowing to reach the optimized thicknesses and doping densities will be investigated

67. Life cycle assessment of plastic waste recycling

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Plastics constitute a significant portion of the world s solid waste, posing a major management challenge To tackle this issue, various technologies, primarily centered around recycling, have been adopted However, like any other technique, method, or technology, mechanical or chemical recycling of plastic waste has both advantages and disadvantages, particularly in terms of ecological impact In this context, an innovative approach based on life cycle assessment has been implemented to guide decision making in waste management, with a specific focus on plastic waste This study provides a summary of a series of studies that have examined life cycle assessment in the context of plastics recycling, with the aim of identifying and quantifying the environmental impacts associated with the recycling process

68. Recovery of Polyphenols from Olive Mill Wastewater(OMWW) using adsorbent co polymeric resins: An optimization of the overall efficiency extraction

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This research was focused in the determination of the overall efficiency of recoveringpolyphenols (colored pollutants) from three phase Olive MillWastewaters (OMWW) Three adsorbent co polymeric resins were used for this extraction Key operating factors were studied,optimized 10 min contact time , an ambient temperature(25 C) and a pH between 4 68 and 7 14 in batch mode were determined for the resins A continuous mode was also carried out in the same operating factorswith an increase of volumetric rate(lower contact time) , to render feasible the industrial scale up The choice was madefor the resin A thanks toitshighest overall efficiency compared to the resin B and C Final polyphenols concentration adsorbed on the resin Awas 54,65 g/L of OMWW An identification of the colored polluants was made using the HPLC MS The antioxydant capacity of polyphenols was also measured

Thematic 11

Genetic Diversity, Genomes and Bioinformatics 1

1. High resolution palynological analysis and palynofacies across the Paleocene-Eocene transition from the Sekada section, Larache region,

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A high resolution palynological study of the Paleocene-Eocene transition from the Sekada section, Larache region, has made it possible to attribute the gray marls of the lower part of this section to the Thanetian based on FOs of Apectodinium spp , Deflandrea phosphoritica, Homotryblium tenuispinosum and Wilsonidium tabulatum and the LO of Alisocysta circumtabulata, and the marly limestones of the upper part to the Ypresian based on FOs of Adnatosphaeridium vittatum, Hystrichokolpoma rigaudiae and Wetzeliella meckelfeldensis The Paleocene-Eocene transition is characterized by alternating palynofacies types I and III, suggesting a proximal to slightly distal depositional environment with normal to low salinity and fresh water supply The dinocysts also indicate a proximal marine environment, but more open around the Paleocene/Eocene boundary The acme of Apectodinium spp along the section indicates warming conditions related to the global event Paleocene Eocene

2. Geological patrimony of the Taza region (Taza Ras El Ma area)

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In Morocco, the geological patrimony is often remarkable, especially in the city of Taza which enjoys a considerable diversity Taza is a town located in the north east of Morocco It is also a confrontation zone between the two major structural domains of Morocco: the Atlasian domain in the south and the Rif domain in the north The present study has enabled the characterisation of some geosites set up by the different geological structures of the Taza region, notably the Ras El Ma area, for a sustainable development management However, this area of Ras El Ma is located 13 kilometres from Taza, its situation is attractive Our site of Ras El Ma is located in a protected area, at the north western entrance of the Tazekka National Park, which aims to preserve natural resources The park therefore, has a diverse natural context, also, geology such as, structure, hydrology, topography andvegetation, which gives it a richness in terms of geodiversity and typical biodiversity

3. Nouvelle conception d un procede de depollution des margines, effluents liquides de l extraction de l huile d olive

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Olive oil production, an agro industrial of vital economic, particularly in Mediterranean countries, is unfortunately associated with the generation of large quantities of OMW (Olive Mill Wastewater) and solid wastes Olive Mill Wastewater poses serious problems; and is an environmental hazard because of its high organic content COD, DBO, high acidic pH, and high electrical conductivity due to the presence of natural mineral salts To solve this issue, the proposed method was to depollute the OMW by a new system, ecological and economic, which consists of the use of the following components: gravel, sawdust, soil, activated carbon, bamboo, and the valorization of the solid residues The results show that the comparison between raw and filtered OMW shows that the concentration of salinity, DBO, EC, and DCO have decreased

4. Selle impact de la recherche et developpement sur la developpement durable du pays

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Croissance

5. L irrigation et ses impacts sur la ressource en eau cas du canal principal d'irrigation de la plaine de M'Pourie a Rosso en Mauritanie

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1 Abstract / Student

6. An unexpected presence in urban environment: factors governing occurrence of the vulnerable European turtle dove (Streptopelia turtur) in the city of Rabat, Morocco

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The knowledge and understanding of mechanisms driving the distribution and selection of habitats by threatened species is a major issue aiming at an efective assessment of their conservation and management In this study, we investigated this issue with regards to the vulnerable European Turtle Dove (Streptopelia turtur) in the capital city of Morocco, Rabat We used data from two sets of variables,landscape composition and human disturbance, to determine the best predictors that cause variation in the European Turtle Dove occurrence by means of generalized linear mixed models Our results showed that this occurrence was (1) positively infuenced by covers of green villa zones and permanent crops and (2)negatively afected by the cover of built up areas, a high level of noise, and a short distance to urban areas Variation partitioning analysis revealed that the shared variation between the landscape composition and space was the most robust in explaining this occurrence (adj R2=0 27)

7. Mise en place et developpement des tourbieres et des marais du Rif au cours des derniers millenaires dans leurs relations avec les changements climatiques et l histoire des activites humaines

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Afin de reconstituer les changements environnementaux locaux affectant les tourbieres du Rif au Maroc au cours des derniers millenaires, cette etude presente une analyse des macrorestes vegetaux conserves dans les depots tourbeux (Tourbiere Bozatate Rif, Maroc) Il combine des donnees des donnees paleoecologiques (pollen, macrorestes vegetaux, flux de sables et de microcharbons) Les resultats sont confrontes a d autres etudes paleoecologiques et a des donnees archeologiques du Rif Maroc, pour discuter des liens entre les changements environnementaux locaux et les dynamiques socio

economiques a plus grande echelle

8. Investigating the Optimal Parameters for Alkaline Activation of Natural Volcanic Pozzolan towards Eco Friendly Material Production: The Role of NaOH Molarity and Na2SiO3 to NaOH Ratio

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The energy intensive and polluting production of Portland cement has led to the search for more ecologically and economically viable alternatives Geopolymers have emerged as one such alternative, holding significant promise over Portland cement The properties of geopolymers depend on various factors, including the nature and concentration of activators In this study, we investigate the effect of Na2SiO3/NaOH ratio and NaOH molarity on the alkaline activation of natural volcanic pozzolan We evaluated the physico mechanical and microstructural properties of the geopolymer using a range of methods, including compressive strength, density, porosity, water absorption, X ray diffraction, infrared spectroscopy, and scanning electron microscopy Our findings suggest that a NaOH molarity of 8 mol/L and Na2SiO3/NaOH ratio of 1 2 are the optimal parameters for activation

9. Evaluation de la pollution des eaux usees de la ville de Benguerir et impact de leurs utilisations sur la faune et la flore des sols irrigues

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Evaluation de la pollution des eaux usees de la ville de Benguerir et impact de leurs utilisations sur la faune et la flore des sols irrigues

10. Morphologie et Sedimentologie des Habitats de Nidification de l Hirondelle paludicole au Maroc

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Mohammed Hilmi, Abdallah Mahamoud, Mohammed Aziz El Agbani & Abdeljebbar Qninba

L'Hirondelle paludicole Riparia paludicola (Vieillot, LJP 1817) est un petit passereau africain de la famille des Hirundinides La sous espece mauritanica est endemique du Maroc, et represente la seule population palearctique de cette espece Au Maroc, l'Hirondelle paludicole est sedentaire et se reproduit le long des cours d'eau, aux lacs et aux lagunes Elle creuse de profonds tunnels dans les berges verticales ou elle construit son nid La nature du sediment et les proprietes morphologiques des nids au Maroc n'ont pas ete suffisamment decrits dans la litterature Dans cette etude, nous effectuons une analyse qualitative et quantitative de la nature du sediment choisi par l'Hirondelle paludicole, en utilisant un echantillon representatif de la population marocaine de l'espece Nous decrivons egalement les caracteristiques morphologiques des nids et de l'habitat environnant

11. Caracterisation et valorisation des geomateriaux comoriens et leurs Utilisations dans le domaine de la construction ecologique dans une perspective de developpement durable

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This study explores the use of geopolymer cements as an eco friendly and cost effective alternative to traditional cement in construction The focus is on synthesizing and characterizing geopolymers using pozzolan varieties from Comoros to align with sustainable development practices Preliminary tests indicate that mineral additives are needed to achieve consolidation during geopolymerization at room temperature, a topic that will be investigated further in this doctoral thesis

12. Attempted inventory of the main constructive geomaterials of the archaeological site of Tamuda (NW Morocco): An overview of its geological context

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The inventory of the constructive geomaterials of the Tamuda site was carried out, to highlight the relationship between the human architecture of ancient civilizations and its natural environment in terms of valuation and use of geological resources in the construction of archaeological sites The realization of the inventory of the constructive geomaterials of the Tamuda site, consists in the identification of these materials on the ground, followed by a characterization and evaluation of the state of their degradation To do this, we have targeted 13 sectors on the basis of the schematic map provided by regional management The results: four main types of geomaterials: sandstone limestone (37%), sandstone (25%), travertine (23%) and massive gray limestone (8%) Other geomaterials such as white limestone, basal vacuolar, bricks, dolomites with elephant skin, flint conglomerate and Calcarenites are also present in low percentage (less than 2%)

13. Exploring Ni2P2O7 and Ni2V2O7 as Alternative Low Cost Cathode Catalysts for Microbial Fuel Cells

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Microbial fuel cells (MFCs) represent a promising technology for wastewater treatment and sustainable energy generation However, efficient cathode catalysts for the oxygen reduction reaction (ORR) remain a challenge due to the scarcity and high cost of noble materials In this comparative study, we explore two low cost cathode catalysts, nickel pyrophosphate (Ni2P2O7) and nickel vanadate (Ni2V2O7), for use in single chamber MFCs

SEM analysis provided insight into the morphology of Ni2P2O7 and Ni2V2O7, while XRD and EDX analyses confirmed their crystalline structures and chemical compositions

The MFCs utilizing Ni2P2O7 exhibited a peak power density of 499 23 mW/m3 and a chemical oxygen demand (COD) removal rate of 62 2% Ni2V2O7 exhibited a maximum power density of 165 83 mW/m3 and achieved a COD removal of 66 63% over 120 hours of operation These results show that both materials have promising potential as low cost and effective alternatives to conventional cathode catalysts

14. Synthese et caracterisation de materiaux eco responsables a base de laitier boue : implications industrielles

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L objectif est d etudier la stabilisation et la solidification d'un geopolymere a base des boues d'epuration et de laitier de haut fourneau (laitier), ainsi que la possibilite d utiliser ce geopolymere comme materiau pour isolation thermique Quatre echantillons ont ete prepares en substituant le laitier par des quantites (10 a 40 %) de la boue , une quantite de sable ainsi qu'une solution de silicate de sodium et d hydroxyde de sodium utilise comme activateur alcalin L effet de la boue chaulee sur les proprietes physico chimiques et microstructurales des geopolymeres synthetises a ete evalue a l aide de plusieurs techniques analytiques Les resultats ont montre que l ajout de 10 a 40% des boues chaulee ont abouti a une diminution progressive de la resistance a la compression du geopolymere synthetise et augmentation de la conductivite thermique ce qui permet une utilisation des geopolymeres synthetises comme materiau

15. VALORISATION DES REJETS DE TRAITEMENT MINIERS ET LEUR UTILISATION DANS LE DOMAINE DE LA CERAMIQUE : CAS DE LA MINE DE LA CALAMINE (MARRAKECH)

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Le contexte geologique du Maroc est favorable pour diverses activites minieres qui sont a l'origine de rejets miniers stockes a proximite des usines de traitement provoquant un impact negatif sur l'environnement L'objectif de ce travail vise la caracterisation et la valorisation des rejets de la Mine de la calamine (Guemassa (Marrakech) en vue de leur utilisation dans le domaine de la ceramique L'etude de caracterisation petrographique de ces rejets, montre qu'il s'agit d'un materiel carbonate riche en petites aiguilles de gypse, ils sont constitues aussi par des oxydes de fer, des fragments de roches L'analyse mineralogique, montre la predominance de gypse, du quartz, de la calcite, et de l'hematite Les analyses geochimiques montrent une teneur elevee en fer, quartz et en calcite Les essais d'application dans le domaine de la ceramique montre que leur temperature de cuisson ne depasse pas 950 C

16. Integrating the geological Heritage for local sustainable development of the Western High Atlas

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This study presents a synthesis of field trips investigations carried out in the Biosphere Reserve of the Arganeriae in the Western High Atlas In fact, this area is characterized among others by valuable natural geological potentials In spite this geological potential, such landlocked and marginalized zones are permanently subject to natural or anthropogenic risks This works aimed to enhance the Paleontological Heritage of two thematic trails within the Agadir Ida Outanane province The proposed work is based on inventory of geosites with scientific and geological significance, the evaluation of their educational and tourism potential, as well as the risks of degradation from the quantification of well defined criteria such as vulnerability, accessibility We have inventoried eight geosites, the best classified according to the high or moderate value of the tourist and educational potential, are those of the Western High Atlas (Geosites whose weighted total is greater than 200)

Thematic 12

Genetic Diversity, Genomes and Bioinformatics (BGDE)

1. Experimental study of the effect of salinity on the plant communities of temporary ponds in Western Morocco

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In Morocco, temporary ponds house a remarkable biodiversity,however they are very threatened by anthropogenic pressures and climate change Therefore, agricultural intensification can induce soil salinization in temporary ponds Likewise, the effects on the characteristic plants remain poorly known In order to study the effect of salinity on the richness and abundance of temporary ponds plants,an experiment was carried out on soil samples taken from 6 temporary ponds from Benslimane These soil samples were homogenized, and distributed over 56 basins,and exposed to four salinity treatments (Control, 1g, 2g and 5g/L) In addition, the identification of species and the measurement of their abundance were carried out every three weeks The results show that salinity leads to a significant decrease in total abundance from 5g/L, but has no effect on the total specific richness of plants This reduction in species abundance may lead an impoverishment of temporary ponds biodiversity in the future

2. Culicidae (Insects, Diptera) of Djibouti Ville and its region: Ecology and evaluation of the sensitivity of the species Aedes aegypti towards the four families of insecticides used

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Mosquitoes in Djibouti are known to be responsible for the transmission of dengue fever Our research work will contribute to the updating of the inventory of species encountered in the country and the monitoring of seasonal fluctuations of larval and adult densities In parallel, ten study stations, spread over the region of Djibouti city were selected The CDC light trap was used to capture adult and a dipper to collect larvae Morphological identification of mosquitoes was done Two platforms: PlantNet and Picture Insect are used for identification of the flora and fauna of the surveyed sites The obtained results so far consist in the sampling of larvae distributed between 3 genera of 4 species and adult specimens divided between 5 species The following species were identified as accompanying mosquitoes: Eleodes gory, Phlebotomus sp Other research components are planned for the current year, including the characterization of mesological parameters during the 2 seasonal campaigns

3. PHENOLOGY OF THE DIGENEAN TREMATODES OF THE COCKLE CERASTODERMA EDULE IN THE LAGOONS OF OUALIDIA, MERJA ZERGA AND ARCACHON

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The present study proposes to investigate the dynamics of the parasite host system, trematode digene and Cerastoderma edule shell (Mollusc: Bivalve) at three lagoons subjected to different temperatures: Oualidia, Merja Zerga (Morocco), and the Banc d Arguin (Bassin d Arcachon, France) The study of the intensity (Int) of infestation shows that it generally increases with time (Days) The increase of the parasite intensity depends on the increase of the dark periods (summer/autumn) At all three sites, infestation was correlated with individual biomass (W) despite the various episodes of parasite dependent mortality whose effects were largely masked by the infestation processes Finally, the increase in parasite intensity variation (DInt) is not related to any of the factors studied It could therefore be intrinsic factors related to the emission of cercariae and dependent mortality processes

4. Systematique,ecologie et Phylogenetique des Monogenes parasites branchiaux des Mormyridae du bassin de la Sanaga Cameroun

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In our study, we will focus on the gill monogenes of the Mormyridae, also called elephant fish Mormyridae in sub Saharan Africa have a major economic and commercial role in artisanal fisheries (Adjibade et al ,2019) The gill monogenes of the Mormyridae in the world are poorly known Only, 12 species have been described so far in seven species of Mormyridae (Blahoua et al in 2009) In Cameroon, 14 species of Mormyridae have been reported from the Sanaga basin (Bitja and Pariselle, 2015) and currently, there are no data on the branchial Monogenes of the Sanaga Mormyridae Hence the main objective of this study, to contribute to the knowledge of the branchial Monogenes of the different species of Mormyridae in the Sanaga basin To achieve this work, sampling in the different tributaries of the basin and the main course of the Sanaga will be carried out over a period of at least 12 months covering the different climatic seasons

5. Study of the monogenea of Mugilidae

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Monogean Ergenstrema mugilis, Paperna, 1964, occurs in the Family Tetraonchidae The aim of this study is to analyse the specificity of the Genus Ergenstrema and to know if this species occurs on the Moroccan Atlantic coast 40 fishes of the genus Chelon (Artedi, 1973) (Mugiliformes, Mugilidae) captured on the Atlantic coast in Rabat revealed the presence of two species of the genus Ergenstrema Paperna, 1964; one new species (Ergenstrema n sp) and the other species that is close to Ergenstrema mugilis The new species (Ergenstrema n sp) differ from other species of genus Ergenstrema already described on hosts of the family Mugilidae by the morphology of the copulatory organ and the size of the vagina The second species differs with (Ergenstrema n sp) by the morphology of the dorsal and ventral hooks

6. The snail as a sentinel species for monitoring environmental pollution

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The continuous release of various chemicals into the environment is now a great concern for the world as some of them persist in the ecosystem The objective of our study is to evaluate the contamination of four (4) families of pesticides (carbamates, aver-

mictines, acetals and benzimidazoles) and two toxic trace metals (cadmium and lead) in the flesh of the snail Helix aspersa aspersa The sampling was carried out on three (3) stations St1T: tomato station, St2P: pepper station, St3A: artichoke station present on an agricultural site in the province of Sidi Kacem Our results showed that the active substances (methaldehyde, carbendazim, abamectin, mancozeb) are present in the three stations (St1T; St2P, St3A) with a strong accumulation of mancozeb and carbendazim Also, the highest concentration was observed at station St3A Indeed, snails have invaded this station, and the high contamination is related to an excessive application of pesticides as compared to the other two stations

7. Assessment of lead and zinc tolerance and accumulation in metallicolous and a non metallicolous of P harmala: potential use in phytostabilization

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The medicinal plant Peganum harmala L grows in eastern Morocco including heavy metals (HM) contaminated soils This work aims to compare the effect of lead and zinc (Pb, Zn) on growth, physiological, antioxidant enzyme activity and Pb/Zn accumulation capacity between non metallicolous (NMP) and 3 metallicolous (MP) populations of P harmala Plants were hydroponically grown for 15 days with HM Results showed that Pb and Zn reduced the aboveground biomass in all populations except Zaida MP and roots biomass in NMP compared to MPs Pb and Zn increased Proline content, CAT, SOD, and APX activity in NMP compared to MP Pb increased anthocyanin content only in Zaida MP NMP accumulated Pb and Zn both in roots and shoots more than MPs, showing that NMP accumulates higher but tolerates less than MP Zaida MP accumulates less amount of Pb and Zn in their tissues and tolerates more than the other populations This suggests Zaida MP of P harmala as the ideal population for phytostabilization

8. Climate change and carbon sequestration potential of Moroccan forestry and agroforestry ecosystems

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For approximately 150 years, the atmosphere has known an increasing concentration of greenhouse gases especially CO2 which is believed to be responsible for about 65% of the greenhouse effect, mainly due to antropogenic activities such as fossil fuel burning, deforestation, and agricultural management practices This increase in GHG has strongly altered the global carbon (C) cycle and contributed to global climate change The carbon sequestration by terrestrial ecosystems is considered by scientists as an efficient and safe strategy, as it simultaneously absorbs atmospheric CO2 and provides enormous ecological benefits (Boulmane et al, 2015) These ecosystems are estimated to sequester about 28% of CO2 emissions from anthropogenic activity (Xu et al, 2018) Therefore, an attempt has been made in this review to provide a detailed overview of the carbon sequestration potential of Moroccan terrestrial ecosystems, particularly forest and agroforestry ecosystems

9. Chromochloris Zofingiensis for Wastewater Treatment and Bioenergy Production

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In the current work, it is suggested to employ various concentrations of whey wastewater (10% , 20% , 50% and 100%) as substrate of Chromochloris zofingiensis to assess nutrient loading and lipid content After 7 days of cultivation, 10% of whey wastewater was demonstrated to be more suitable medium for Chromochloris zofingiensis biomass and lipid production than others dilutions The strain can remove nitrate, total nitrogen,

phosphate, total carbon, chemical oxygen demand and lactose from 10% of whey wastewater about 72 53% , 83 13% , 89 09% , 69 50% , 82,55 and 79 13% respectively with the initial composition 130 mg/L of nitrate, 390 17 mg/L of TN, 9 55 mg/L of phosphate, 9900 84 mg/L of TC, 6556 mg/L of COD and 4941 mg/L of lactose under 20 C and 150 mol photons The highest lipid content (36 07%) was obtained using 10% of whey wastewater compared to 20% , 50% and 100% of whey wastewater (lipid content ranged between 30 82% and 34 06%)

10. Socio ecology of the invasion of the American blue crab (Callinectes sapidus) in Morocco: The lagoon of Marchica

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Callinectes sapidus, a crab species native to North America, has been introduced into Moroccan waters and is rapidly invading the country s Atlantic and Mediterranean coasts Socio ecological studies of biological invasions provide insight into these impacts, but require integrated methods that consider both social and ecological aspects Social and ecological field surveys can help understand fishing behavior and the dependence of local communities on invasive species The concept of ecosystem services provides a useful framework for assessing ecosystem benefits, but requires a detailed understanding of stakeholders and their interests in these services Linking ecosystem services to stakeholders is essential for ecosystem effectiveness, equity, and sustainability Systematic mapping of potential stakeholder interests in these services at Marchica Lagoon helps identify conflicts of interest and opportunities for collaboration to improve ecosystem management

11. Etude de la dynamique d anguilla anguilla L 1758 au maroc cas du bassin de sebou

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L'anguille europeenne est une espece de poisson migrateur dont les stocks n'ont fait chuter ces dernieres vingt dernieres annees Son declin a conduit a l'inscription de cette espece dans l'annexe II de la convention internationale CITES en 2007 Le Maroc a ete invite par secretariat de la CITES d'etablir un plan de gestion de l'espece Notre theme de recherche s'inscrit dans ce cadre, il s'articule sur la connaissance de la dynamique de la population de l'anguille europeenne au Maroc et plus particulierement au niveau du bassin de Sebou dans le but d'etablir un plan de gestion de l'espece Les parties etudiees dans ce projet de these sont : Le recrutement et la modelisation des captures de civelles

Suivi de la montaison de l'Anguilla anguilla au niveau de la passe a anguille installee au niveau de barrage de garde

Etude de la biologie, la parasitologie et l'otolithometrie de l'anguille argentee

Cartographie et description des habitats

Anguilliculture et l'etude socioeconomique

12. Spatial study and management perspectives: Case of the Maamora forest (North west of Morocco)

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The natural forest of Maamora is still alive but continues to be degraded over the years by the increase in anthropic pressures and the worsening of climatic conditions, resulting in a sharp decline in its area and an acceleration of desertification processes The present study is part of this framework and aims at carrying out a diachronic approach based on satellite data dating from 1989 to 2019 This is from the supervised classification of satellite images of Landsat type in order to map the land use of the study area over an interval of 10 years and to proceed thereafter to the development of maps of change and analyze the current state of the forest of Maamora Thus, this analysis will undoubtedly have a great contribution to limiting the effect of the degradation of natural resources at the level of the forest

of Maamora through mainly the implementation of actions of management and development of the various components of this landscape by the decision makers

13. Bio Ecology of the blue crab Callinectes sapidus, Rathbun, 1896 in the Marchica lagoon

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Callinectes sapidus or blue crab is an invasive species, native to the western Atlantic coast, which is reported for the first time in the Marchica lagoon in 2017 The present study aims to provide baseline information on the Bio Ecology of the C sapidus population during the period from May 2021 to April 2022 A total of 388 specimens were studied, of which 257 were males and 133 females The carapace width varies between 51 mm and 198 mm, with a dominance of the 160 mm size class, and the length varies between a minimum of 25 mm and a maximum of 96 mm This study shows the first information on the biology of C sapidus in the Marchica lagoon, and will be followed by an ecological study to determine the factors that control the distribution of this species

14. The study of species diet in the Moroccan South Atlantic marine ecosystem

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This study aims to complete the understanding of the functioning of the Moroccan South Atlantic marine ecosystem by focusing on the organization of its food web, using a metabarcoding approach, which is a key issue for the fishery certification process In this study, several genes will be used :1) COI and 18S rRNA genes in order to identify the taxonomic group of prey items and to quantify prey items and then 2) more specific genes, depending on the identified taxonomic groups of prey, will be used to identify the prey at the species level A local database of reference of COI sequences has been built using 100 species from the Moroccan South Atlantic ecosystem and 74% of the species have been successfully identified at the species level and 21% of the species have been successfully identified at the genus level This local database will help to discriminate at the species level the COI sequences obtained using the metabarcoding approach

15. Database of toxic plants in Morocco: a tool for research and prevention

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Due to its geographical location and geological history, Morocco has a diverse and rich flora with over 4,500 species, including 600 species with medicinal or aromatic properties However, only 80 species are utilized by the Moroccan population, while many others are toxic and can cause severe symptoms or even death, even at low doses To address this critical challenge, intensive research efforts are being made to study toxic plants In this work, we reviewed the most significant toxic plants in Morocco, with the main objective of creating a comprehensive database providing information on the botanical families, biological types, biotope and distribution of species, toxic parts, degree of lethality, and categories affected by these plants This database will have important implications for managing the risks of plant intoxication associated with the use of plants in Morocco

16. Effect of tree shelters and regeneration method on survival and growth of cork oak plantations in the Maamora forest, Morocco

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An 8 year study was conducted in Mamora forestemploying two regeneration methods: direct seeding and seedlings on an

area of 1 5 ha consisting of 864 plants A split plot design was developed with three replications of 36 plants for each of the four shelter treatments including T0 control, T1 1 20 m, T2 1 50 m and T3 1 80 m Our results showed that plants from direct seeding were 97 % more successful than those from seedlings While the shelters had minimal effect on survival early on, their positive influence became evident in the later years of the study Plants installed with the 1 20 m shelter were above 50% successful Regeneration method had a strong influence on height and diameter growth, with seedling units showing taller plants initially Similarly, sheltered trees exhibited greater height and diameter than unsheltered trees As for overall growth rate, sheltered plants showed faster rates of vertical growth, while unsheltered plants showed faster radial growth

17. Parasites of the invasive American blue crab Callinectes sapidus Rathbun, 1896 (Decapoda, Portunidae) in coastal ecosystems of Morocco: a One Health approach

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Callinectes sapidus Rathbun, 1896, native to the western Atlantic, has been established in various Moroccan coastal ecosystems with the recent interest for human consumption As such, it constitutes a good model for understanding biological invasions in the context of the One Health concept The main objective of this study is to understand the interactions between the blue crab and its parasites to assess their effects on native biodiversity, and risks to human health Preliminary dissections of specimens of blue crab from Morocco and examination of their organs under a stereomicroscope reveal the presence of a dinoflagellata Similar dissection of blue crab from the western Atlantic revealed seven parasites, including a digenean, a haplosporidean, and a nematode Various morphological and genetic diagnostic methods will be used to monitor the presence of potentially invasive parasite lineages associated to the American blue crab in Morocco and the western Atlantic

18. Modeling the probability of occurrence of wild boar in Morocco

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Wild boars are a highly successful invasive species that have caused significant agricultural damage and pose a serious threat to plant and animal communities due to their omnivorous diet and rooting behavior In order to better understand the factors that determine their invasive potential and guide future eradication efforts, we modeled the current distribution of wild boars in Morocco Using national scale data, we estimated the probability of wild boar occurrence across the country using a logistic discrimination function and analyzing the environmental covariates that influence the species distribution Our results suggest that cold temperatures and availability of water are the most significant limiting factors to the distribution of wild boars, while higher habitat heterogeneity provides access to multiple key resources such as water, forage, and cover We also found that high probability of occurrence is associated with frequent high temperatures

19. Effect of tuber spp on Quercus species

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In Morocco, trees of the genus Quercus occupy a large part of the country s green spaces They are found in the Maamora forest (mainly Quercus suber) and the Jaaba forest in the Middle Atlas (Q ilex and Q faginea) The species Q ilexas well as Q suber are very importantat the ecological and economic level They are used for grazing, by livestock, and as-firewood for cooking And because of these abusive uses, we have noticed-deforestation and a decrease in the number of trees of oak species Thanks to its mycorrhizal association with many species of Tuber spp , which are very important economically thanks to their

price, which reaches 2500; per Kg We have noticed a fertilizing effect of Tuber spp on Quercus species thanks to the mycorrhizal association of truffle and Quercus Mycorrhizal plants have significantly better results in terms of aerial length, root length, fresh weight, and dry weight

20. Estimating forest leaf area index of Argania spinosa using satellite images

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Leaf area index (LAI) is a key parameter for describing vegetation structures and is closely associated with vegetative photosynthesis and energy balance The accurate retrieval of LAI is important when modeling biophysical processes l of vegetation and the productivity of earth systems This study evaluated the RF method for predicting LAI using ground measurements and satellite images The results in this study demonstrate the practical ability of the RF method in predicting LAI, which can also be applied to the estimation of other vegetation traits and the selection of relevant variables used in ecological models

21. Impact of drought on agronomic and quality parameters in durum wheat varieties in the context of climate change

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Durum wheat is one of the pioneering cereals of food security due to its considerable caloric and protein content Drought is one of the major causes of yield losses for this crop This study aims to evaluate the impact of drought on durum wheat yield and quality parameters and identified climate resilient genotypes Thirty six (36) genotypes were trialed across three locations in Morocco for two consecutive seasons (2020 2022) The 2021 22 season had considerably less rainfall than the previous season, with an average decrease from near 70% , resulting in an 80% decline in yield in favorable areas and a 100% loss in arid regions Drought also caused a decrease in plant height, aboveground biomass, and number of fertile spikes However, drought had a positive effect on yellowness index and volume of sedimentation Genotypes G4, G30, and G24 were identified as drought resilient and require further evaluation The impact of drought on agronomic yield is alarming, especially in arid areas

22. Evaluation qualitative et quantitative des communautes zooplanctoniques de la lagune de Merja zerga Impact des facteurs anthropiques sur la distribution de cette communaute

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Moulay Bousselham is a lagoon located on the Atlantic coast of Morocco, which is home to a rich biodiversity, especially the group of zooplankton The composition of zooplankton varies according to seasons and environmental conditions Continuous monitoring of zooplankton is important to understand the ecosystem dynamics and to maintain the biodiversity Zooplankton, are floating organisms in water, play a vital role in the marine ecosystem as food for marine animals Yet, anthropogenic actions such as overfishing,pollution are having significant impacts on the biodiversity and quantity of zooplankton in the lagoon The aim of this research is to study the diversity and distribution of zooplankton communities in the lagoon, as well as the factors that can influence them A seasonal sampling was carried out in autumn and winter, 7 stations were sampled and 34 zooplankton samples were collected A clear predominance of copepods was observed This population is dominated by-Calanoida

23. Les Biologistes s'interrogent, les Monogenes repondent

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Monogeneans are Platyhelminthes (flat bodied worms) that are parasitic on aquatic organisms (cephalopods, amphibians, reptiles, and mammals), mainly fish (in freshwater as well as brackish water) They are characterized by a direct life cycle (no intermediate host) It is accepted that every fish species has at least one species of monogeneans This simply means that the number of monogenean species is greater than or equal to the number of fish species Most monogeneans live on the external surface of the fish (skin, fins, gills, oral cavity, and nostrils) Biologists use these organisms to answer questions related to ecology, environment, systematics (taxonomy), biogeography, and evolution What approaches do they use to achieve this? Our presentation will answer this question

24. The composition of the phytoplankton community and how it relates to the productivity of the phytophagous species Oreochromis niloticus and Oreochromis leucosticus in Lake Edward and Lake George (East Africa)

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Oreochromis niloticus (Linnaeus, 1955) is among the most commercialized and cultivated fishes worldwide It co occurs with Oreochromis leucosticus (Trewavas, 1933) in Lakes Edward and George Both species were reported to mainly feed on algae The two lakes are connected but differ in hydrochemical properties, algal communities, and productivity We aim to analyze the diet of these fishes to verify whether variation in algal communities may be reflected in the diet of these fishes and to correlate their growth to the composition of the algal communities From the 13 guts already assessed, we can confirm that O leucosticus and O niloticus mainly feed on algae We found 50 taxa of algae, such as diatoms, dinoflagellates, euglenophytes, cyanobacteria, and chlorophytes Diatoms are the most diverse group (26 taxa) We plan a comparison of the diets of the two Oreochromis species according to lakes For this, we will investigate 40 gut samples of each fish species

25. Taxonomic and functional beta diversity of marine communities along the Moroccan south Atlantic coast

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This study aims to dissect spatiotemporal changes in functional and taxonomic beta diversity of marine fish along the south Atlantic coast of Morocco Moreover, the spatiotemporal variation was investigated between three periods of 5 years each in two different zones, through the decomposition of beta dissimilarity into its turnover (species replacement) and nestedness (richness difference) components Furthermore, Analyzing this spatiotemporal variation showed that functional nestedness covers the majority of functional beta diversity and that taxonomic beta diversity was mainly driven by taxonomic turnover Observing on a temporal scale, we can detect a significant variation in taxonomic beta diversity and its turnover component as well as in functional beta diversity and its nestedness component between the three studied periods In the other hand, no significant difference was observed in taxonomic and functional beta diversity between the two zones across the spatial scale

26. Cartographie des lots de chasse amodie au Maroc : Une pre etape pour l'etude de l'effet du paysage sur la selection des sites de nidification de la Perdrix gamra (Alectoris barbara)

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L'utilisation du Systeme d'Information Geographique est de plus en plus utilisee

pour le suivi de la faune sauvage Dans le present travail nous avons utilise cet outil pour caracteriser les habitats de nidification d'une espece gibier,la Perdrix gambra dans trois lots de chasse amodie La classification supervisee a ete realisee sur des photos satellitaires sentinel 2 en adoptant la"Semi Automatic Classification Plugin"de QGIS pour etablir les cartes d'occupation du sol des lots amodies En parallele, la recherche des nids de ce gibier a ete menee entre les mois d'avril etjuin Les cartes d'occupation des soles des trois lots amodies ont ete elaborees et un total de44 nids a ete localise etgeoreference Le support cartographique ainsi etablie sera exploitee pour extraireles variables relativesa la composition et la configuration du paysage,lesquelles seront considerees comme des covariables pour l'identification des determinants de la probabilite de presence des nids de la Perdrixgambra

27. Otolith shape provides new insight into the stock structure of Scomber colias along the North West African coast

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Otolith as a phenotypic character is a response to environmental factors and genetic background On this basis, otolith shape analysis was used to investigate Scomber colias stock structure along the northwest Atlantic coast, from Senegal to the north of Morocco Our results show a highly significant differentiation among the samples Along the studied area, otolith shape analysis suggests the existence of 2 groups with an overall correct classification of 90% and implies the existence of a barrier at the level of 28 N (Tarfaya), suggesting limited connectivity between the two populations Therefore, the mean otolith shape based on wavelet reconstruction for the two populations-reveals the high phenotypic plasticity for Scomber colias otoliths The whole variation between the two morphotypes highlights the environmental heterogeneity of the Northwest African water

28. Characterization of the plant communities of the littoral dunes of the bay of El Haouzia (Province of El Jadida)

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The Haouzia Bay is an Atlantic coastal striplocated northeast of the city of El Jadida The persistence of the main psammophilous groups of mobile and semi fixed dunes in the Haouzia coastline, makes such a place an ecological heritage to preserve However, an important pressure on the flora of the dunes is noted, caused by the increasing anthropogenic activities The present work aims to inform on the state of the ecological groups populating the mobile and semi fixed dunes of the site through the analysis of floristic richness, diversity and equitability of the flora The results show that the floristic richness oscillates globally between 15 and 1 species with a large dominance of the stations with low or average diversity and equitability of the flora Such results reveal an important disturbance of the flora of the site and raise the alarm about the problems of erosion of biodiversity and the state of health of plant groups of mobile and semi fixed dunes of the bay of Haouzia

Thematic 13

Biotechnology and valorization of bio-resources

1. Valorization of Moroccan Phosphate Sludge Through Isolation and Characterization of Phosphate Solubilizing Bacteria and Assessment of Their Growth Promotion Efect on Phaseolus vulgaris

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Mining activities generate considerable quantities of waste that are usually accumulated in the open air and form dykes that disfigure the landscape and arable land The present study aims to isolate and select the phosphate solubilizing bacteria (PSBs) from phosphate sludge (PS) to improve the agronomic efficacy of phosphate bio fertilizers After molecular analysis, twenty four isolates were retained for further in vitro analysis The selected strains have signifcantly different abilities to solubilize rock phosphate and tricalcium phosphate, produce phytohormones, siderophores, hydrogen cyanide, and lytic enzymes (cellulase and chitinase) The majority of PSBs strains were resistant to extreme abiotic stresses and tolerant to heavy metals In vitro inoculation of P vulgaris plants with three efficient PSBs strains significantly increased shoot and root dry biomass The selected PSBs could be used as potential biofertilizer candidates to increase plant productivity

2. Isolement et caracterisation moleculaire de rhizobacteries multi stress tolerantes favorisant la croissance des plantes dans la rhizosphere de l'olivier au sud du Maroc

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Recemment, l'utilisation des rhizobacteries dans la mediation du stress abiotique est une approche prometteuse de plus en plus exploree L'objectif de cette etude est d'isoler, de caracteriser et d'identifier des rhizobacteries favorisant la croissance des plantes (PGPR) tolerantes au stress abiotique Au total, 94 souches bacteriennes ont ete isolees de la rhizosphere d'oliviers dans la region de Zagora au Maroc 24 ont montre une tolerance aux : secheresse (Aw ; 0,91), salinite (10%) et haute temperature (55 C) egalement, des caracteristiques PGP ont ete revelees, telles que la solubilisation de phosphate et la production de siderophores, d'IAA et d'enzymes hydrolytiques Grace a l'analyse des sequences de l'ADNr 16S et la MLST (Multi Locus Sequence Typing), trois isolats identifies comme etant Bacillus paranthracis (OZ 60) et Bacillus paralicheniformis (OZ 48 et OZ 77) ont montree des taux les plus eleves en termes des proprietes PGP et de tolerance aux stress abiotiques

3. The inoculation with Ensifer meliloti sv rigiduloides improves considerably the growth of Robinia pseudoacacia more than Ensifer kummerowiae sv meliloti under lead stress

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With the aim to use black locust for phytostabilization of the Zaida abandoned mine tailings in Eastern Morocco, we isolated and characterized its indigenous microsymbionts Thus, out of 27 bacteria isolated, four strains were selected for the analyses of symbiotic, molecular, phenotypic, as well as plant growth properties under increasing lead acetate concentrations The Phylogenies of rrs, the MLSA, and symbiotic genes analyses showed the affiliation of the strains with Ensifer meliloti sv rigiduloides and E kummerowiae sv meliloti

Inoculation experiments under metal stress showed that both strains improved plant growth and chlorophyll content The plant proline content increased as a response mechanism to increasing concentrations of lead

Our results show that E meliloti sv rigiduloides strain RPZ12 improves plant growth under lead stress conditions more than E kummerowiae sv meliloti strain RPZ17 This is the first description of symbiovar meliloti in E kummerowiae

4. Presence of Ochratoxinogenic Fungi and Ochratoxin A in Durum Wheat Seeds from Different Regions of Morocco: An Investigation on Contamination and Climate Influence

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Ochratoxin A (OTA) is a mycotoxin that can contaminate food and feed, particularly grains It is generated by some species of fungi The aim of this work was to investigate the presence of OTA and ochratoxinogenic fungi in durum wheat seeds harvested in four different regions of Morocco during three consecutive agricultural campaigns 2019 2022 Samples of durum wheat grains from the 2020 21 cycles contained amounts exceeding the maximum limit of OTA residues set in Moroccan legislation A niger, A ochraceus, and P verrucosum were identified as OTA producers using the PCR reaction by the specific and putative polyketide ochratoxinogenic genes primers The results showed that durum wheat seeds in Morocco are naturally contaminated with OTA producing fungus The results also highlighted the influence of climatic variations on the presence of various ochratoxinogenic species in the 4 regions studied and during the three years of investigation

5. Morphological, chemical, genetic diversity and nutritional characteristics of Moroccan Mentha species

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The genus Mentha L is one of the most important taxa of the Lamiaceae family, it has been valued since ancient times by means of its aromatic and therapeutic properties Mentha is used for its antioxidant, tonic, digestive, antiseptic and refreshing properties The systematics of the Mentha genus is very complicated and still ambiguous, mainly due to the variation in basic chromosome number, frequent interspecific hybridization and their high polymorphism Combining morphological, chemical, and genetic studies will enable us to identify the Mentha species and eliminate any remaining ambiguity while presenting a genetic empress for each species Most medicinal plants provide practically almost all of the organic and mineral components recognized as necessary for human nutrition The use of mint is still restricted to its essential oils or even by infusing its leaves and stems, It would be advantageous to know its nutritional content so that we can get more benefit from it

6. Physiological, biochemical and molecular study of the nitrogen fixation symbiosis of L albus Bradyrhizobium under Pb stress

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Lupinus albus is a member of the Fabaceae family, it is known for its ability to adapt to limiting conditions and soils polluted with heavy metals L albus establishes a nitrogen fixation symbiosis with soil bacteria of the genus Bradyrhizobium The main objective of this work, is to identify the physiological, biochemical and molecular bases of the L albus Bradyrhizobium nitrogen fixation symbiosis under Pb stress For this purpose, we carried out: i Characterization of Bradyrhizobium strains in terms of their Pb tolerance and nodulation capacity, ii Study of L albus tolerance to Pb Results showed that 4 Bradyrhizobium strains tolerate more than 650 g/ml of Pb and have the ability to induce nodulation of L albus Furthermore, L albus tolerates up to 250 M of Pb This study will allow to take advantage of L albus characteristics to restore metal polluted sites using phytoremediation approaches

7. The in vitro antifungal potential of Mentha pulegium extracts and essential oil for the biocontrol of Fusarium oxysporum f sp albedinis

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Date palm is threatened by Fusarium oxysporum f sp albedinis (Foa) Aromatic plant extracts can be used to develop biological control of Foa This work aimed to evaluate the antifungal potential of Mentha pulegium extracts and essential oil Four concentrations of extracts and essential oil were used TPC, TFC, POX, and CAT were determined for extracts Essential oil showed the strongest inhibition, at 3 l mL 1 completely inhibited Foa Ethanolic extract at 5 mg mL 1 inhibited Foa spore germination, mycelial growth, and sporulation by 80% , 65% , and 82% , respectively The weakest effect was recorded when the aqueous extract was used Ethanolic extract highlighted the highest levels of TPC (117 mg GAE/g DE), TFC (50 9 mg QE/g DE), and POX (351 64 U/min), in contrast, the highest activity of CAT was recorded for the aqueous extract (11,96 mM H2O2) These results emphasize the potential of Mentha pulegium for further use in the biological control of Bayoud disease

8. Identification of Aflatoxigenic Aspergillus Species in Moroccan Durum Wheat using Multiplex PCR and High Performance Liquid Chromatography

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Aflatoxin production by Aspergillus species occurs naturally and can be toxic to humans, poultry, and livestock Using multiplex PCR, fungal strains isolated from durum wheat harvested from 4 bioclimatic regions of Morocco were examined for the presence of genes involved in aflatoxin metabolic pathways

aflR 1, omt A and ver 1 genes were the focus of the PCR experiment designed to identify toxic Aspergillus species High performance liquid chromatography (HPLC) was also used in this investigation to determine the toxigenicity of isolated Aspergillus species and their levels of aflatoxin production Results showed that analyzed samples of Moroccan durum wheat contain significant amounts of aflatoxins and aflatoxinogenic species, with concentrations ranging from 0 025 g/kg to 20 95 g/kg It also proved that aflatoxigenic species of Aspergillus can be detected quickly and reliably by searching molecularly the presence of genes involved in the production of aflatoxin

9. Effect of Rhizobia x wheat genotypes interaction on drought tolerance and agronomic performance of wheat in Morocco

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Morocco s productivity is very low (2 5 t/ha) mainly due to drought There s a considerable gap between annual production and demand for consumption Thus, Morocco is under the must to deploy environmentally friendly strategies to cope with this increasing demand One of the novel techniques recently used is the inoculation of PGPB which has been reported as one of the strategies to enhance drought tolerance in plants, by inducing drought tolerance through various mechanisms such as production of siderophores, osmoregulation, production of phytohormones, and, most importantly, production of long chain extracellular polysaccharide (EPS) which improves plant growth The aim of this study is to: Identify the biochemical, morphophysiological, and molecular responses of the rhizobia X wheat interaction under drought conditions By Using two elite genotypes and 3 different strains tested for phosphate solubilization, phytohormone, indole acidic acid, and gibberellic acid under drought stress

10. Evaluation des niveaux de pathogenicite/parasitisme des especes d'Orobanche / Phelipanche vis a vis differentes especes de legumineuses au Maroc

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Les legumineuses sont parmi les cultures importantes ayant un impact majeur sur l'agriculture, l'environnement, la nutrition humaine et animale Cependant, leur production s'est vu diminuer au cours des dernieres annees du aux contraintes biotiques et abiotiques Parmi les contraintes biotiques majeures, on retrouve la plante parasite Orobanche qui cause des degats considerables, en particulier aux legumineuses Afin de pouvoir limiter les degats de ce parasite, le developpement de cultivars resistants reste une priorite Le succes de cette methode repose sur une comprehension approfondie de l interaction plante hote/parasite L objectif de ce travail est d evaluer la specificite des populations d Orobanche/Phelipanche : O crenata/feve (Oc/F), O crenata/lentille (Oc/L), O crenata/pois chiche, O crenata/gesse, O foetida/Medicago et vesce, O cumana/tournesol ainsi que P schultzii/fenouil vis a vis la feve, la lentille, le petit pois, le pois chiche, la gesse, la vesce et le Medicago

11. Front face fluorescence spectroscopy enable rapid differentiation of Moroccan extra virgin argan oils with respect to their geographic origin

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This study examines the feasibility of using front face fluorescence (FFFS) for the authentication of 100 extra virgin argan oil (EVAO) samples originated from 5 regions in Morocco (Chtouka, Essaouira, Sidi Ifni, Taroudant and Tiznit) By applying principal component analysis (PCA) and factorial discriminant analysis (FDA), separately, to the emission spectra acquired after excitation wavelengths set at 430, 290, and 270 nm, a perfect discrimination between EVAO samples according to their geographical origin was observed achieving 100% of correct classification It could be concluded that the FFFS could be considered as a potentially efficient tools for determining the geographical origin of EVAO, providing rich opportunities for characterisation and authentication of EVAO at a very low cost

12. Phytic Acid Mineral Complexation in Wheat: How can we Improve its Bioavailability ?

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Currently, mineral deficiency is one of the major public health problems worldwide, especially among populations with a vegetarian diet This diet emphasizes consuming cereals, particularly wheat However, phytic acid in wheat limits the bioavailability of minerals, despite its high nutritional value, by preventing their intestinal assimilation via complexation mechanism Several methods have been proposed to reduce phytic acid levels in wheat to enhance mineral bioavailability These processes include the activation of endogenous wheat phytases by fermentation, germination, soaking, acidification with lemon juice or lactic acid, as well as the addition of exogenous microbial phytases and ascorbic acid These technological processes improve mineral bioavailability and have promising industrial applications for reducing the prevalence of mineral deficiencies in wheat consuming populations

13. Phenotypic characterization of Botrytis cinerea isolates in grapevine

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Grapevine (Vitis vinifera L) is one of the world's most important cultivated plants but it is vulnerable to many fungal diseases, like gray mold (Botrytis cinerea Pers) which is highly destructive In Morocco, the yield is affected by a striking development of gray mold when conditions are met, and the damage can be quantitative and qualitative The aim of this study was to review the diversity of Botrytis cinerea in Moroccan terms by collecting isolates across different sites This study focused on the phenotypic characterization of isolates based mainly on the mycelium appearance, intensity of sporulation and sclerotia distribution One hundred and twenty two isolates from grapevine were sampled during two year in ten sites in order to explore phenotypic characterization, pathogenicity and mycelial growth Two phenotypic classes, sclerotial and mycelial, were observed on both PDA and MA media The established phenotypes show the great phenotypic diversity of b cinerea in Morocco

14. etude des strategies d'adaptation aux effets des changements climatiques des elevages caprins conduits sur paturages de hautes montagnes du Nord du Maroc

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Les changements climatiques (CC) ont des consequences profondes sur la vie des gens et la biodiversite Au Maroc, l elevage est pratique dans des ecosystemes pastoraux diversifies et est limite par les ressources hydriques, qui sont soumises aux effets des CC Pour faire face a ces effets nefastes, ce projet de recherche vise a evaluer les mecanismes d adaptation des eleveurs caprins en hautes montagnes dans la region du nord du Maroc L objectif est d identifier les strategies d adaptation des eleveurs face aux CC, en matiere de production fourragere, l approvisionnement alimentaire, la conduite technique du troupeau, la production et les pratiques pastorales Les resultats escomptes comprennent l identification des strategies d adaptation face aux CC et des impacts des CC sur les ressources naturelles et la vulnerabilite des eleveurs

15. Comparison of the antioxidant activity of Carob pulps and seeds (Ceratonia siliqua L) collected in different sites of Morocco

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The carob tree (Ceratonia s iliqua L) is native to Mediterranean countries, it is robust and rustic Carob pulp and seeds of three Maroccan regions have been the object of our study, in order to determine their the antioxidantactivity was tested by the DPPH The results showed that antioxidant capacity with acetonic extract vary depending on the place

of harvest Evaluation of antioxidant activity ofacetonic extract by DPPH method showed an important percentage reduction of DPPH, up to 91 20% for pulps and to 96 58% for seeds Thus, carob pulps and seed has shown strong antioxidant activity and has proven its potential to open new mechanistic approaches to antidepressants and the development of anti anxiety drugs

16. Contribution a la valorisation des huiles essentiels du romain, cas de la province de Taourirt

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Le romarin est une Plante Aromatique et Medicinale d une grande importance Cette etude a montre que sa composition chimique en huiles essentiels depend des facteurs climatiques (precipitation et la temperature en grande partie) ainsi que de la periode de recolte dans le cycle vegetatif Pendant l'hiver et le printemps le romarin est caracterise par une composition chimique qui est dominee par de fortes valeurs pour les variables Borneol, Terpineol et Camphre Mais il faut toutefois permettre la mise en place de la filiere apicole au printemps, bien que la recolte soit possible Par contre, la periode d'Ete et Automne caracterisees par de fortes valeurs de la temperature est consideree comme une periode opportune pour la plante dans le processus de biosynthese ou le metabolisme cellulaire est d'une activite plus importante Cette periode est caracterisee par un romarin domine par de fortes valeurs pour les composes a base de 1,8 Cineole, Camphene, a pinene

17. "Argania spinosa L Skeels" in vtro: entre la germination et la multiplication en masse

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L arganier est une Sapotacees, endemique du sud ouest marocain C est une essence agrosylvopastorale presentant un role socio economique et environnemental tres important Il s adapte bien a l aridite Toutes ses parties sont exploitables Cependant, l arganier souffre d une forte degradation due a une surexploitation anthropique,au surpaturage, et a une regeneration quasi nulle Face a cette regression alarmante, des programmes urgents de reboisement s imposent et constituent une composante majeure du Plan Maroc Vert Pour accelerer le reboisement, l utilisation des techniques in vitro notamment la micropropagation va permettre une production rapide, en masse et conforme a la plante mere Bien que chez l arganier, l enracinement des microboutures soit tres difficile et pose un serieux probleme,notre travail experimental realise sur les boutures nous a permis l obtention de plantules avec des racines vigoureuses Ainsi, les resultats obtenus semblent encourageants

18. Different species of Bradyrhizobium from symbiovars genistearum and retamae nodulate the endemic Retama dasycarpa in the High Atlas Mountains

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Retama dasycarpa is an endemic Retama species native to the cold semi arid bioclimates of the HighAtlas Mountains in Morocco In this work, we analyzed the diversity of the microsymbionts nodulating this plant and their different phenotypic and symbiotic characteristics Phylogenetic analysis of the 16S rRNA gene revealed that the tested isolates clustered in the Bradyrhizobium genus Multilocus sequence analyses of four housekeeping genes for 12 selected strains grouped them into four different clusters The individual phylogenies of these core genes and the symbiotic genes nodC, nodA, and nifH were congruent These isolates showed a broad host range, being able to nodulate different legume hosts Furthermore, out of the 12 selected strains, some displayed plant growth promoting features The present work provides, for the first time, a detailed description about the microsymbionts associated with the

endemic legume R dasycarpa

19. Phytoextraction of rare earth elements from Bauxite residues using Phytolacca americana

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Rare earth elements, which are highly demanded metals in advanced technologies, suffer from a supply shortage Phytoextraction of REEs from secondary sources such as bauxite residues (BRs) can be considered an eco friendly extraction procedure In our study, bauxite residues (BRs) from Bouc Bel Air region (France) are used as a secondary source for REE extraction Physico chemical analyses show that BRs present high alkalinity and salinity and a deficiency in nutrients In BRs, 40 day old Phytolacca americana plants, a REE hyperaccumulator, showed low REE phytoextraction due to the influence of an alkaline pH and stable REE bearing phases Thus, to investigate the involvement of phosphorus in low REE phytoextraction from BRs, an experiment was conducted in modified BRs with different types of phosphorus amendment (gypsum, sewage sludge (STEP), or compost) In parallel, hydroponic tests were conducted to evaluate the REEs hyperaccumulation capacity of P americana

20. Effect of Culture conditions on Growth, Morphology and C phycocyanin concentration of Helical and Linear Arthrospira platensis

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AArthrospira (Spirulina) platensis is an economically well known filamentous cyanobacteria In the current work, we monitored the growth and morphological characteristics of trichomes (critical for harvesting) of the two major spirulina strains as well as the concentration of C Phycocyanin produced under different conditions carbon concentration, pH, and salinity The results obtained results showed that linear spirulina was less affected by tested culture conditions than helical strain For both, a maximum growth 70% was obtained by reducing potassium concentration at 0 5g/l Tested conditions affected also the morphology of trichomes Indeed, the increase of pH at 11 proved a long filament with up to 50 spires for helical filament In general, C phycocyanin concentration of linear spirulina was higher than helical spirulina 3 4 vr 2 3 mg/ml, respectively These results indicated that linear spirulina is more suitable for spirulina culture for C PC production

21. la transformation de l orge en produits alimentaire original

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L'utilisation de l'orge en alimentation au Maroc a regresser depuis des annees et actuellement le ble est la cereale de base Vu les vertus de l'orge sur la sante humaine, sa composition nutritionnelle ainsi que sa resilience depassant toutes les autres cereale, l'objectif du present travail est d'etudier la composition de l'orge marocain et sa valorisation en alimentation par la mise au point de produits derives de haute valeur ajoutee et adaptes au mode de vie actuel Et aujourd'hui on constate que la population marocaine est dans l'obligation de revenir a l'orge et de faire revivre le savoir faire marocain en matiere de produits a base d'orge L'agroalimentaire doit s'orienter vers la transformation de l'orge en creant des aliments a l'orge adaptes au nouveaux habitudes alimentaires et aux rythmes de vue actuel

22. Effect of organic carbon as alternative source of bicarbonates on the Spirulina platensis growth

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Spirulina platensis is the first microalgae produced worldwide Sodium bicarbon-

ates are the mostsources of carbone used for spirulina culture However, due to its elevated cost, carbon source is a limiting factor for large scale cultivation In the currentstudy, we evaluated the faisability of mixotrophic culture by decreasing bicarbonates concentration as well as introducing organic carbon sources such as starch and glucose (All of them tested at 0 5 ; 1 ; 2 5 ; 5 ; 10 and 15 g/l) The best growth was obtained with lower bicarbonates concentration (5g/l) Glucose used at 1 g/l gave the same growth obtained with bicarbonates,Starch supported the best growth at 0 5g/l with an improvement of 11% in comparision with bicarbonate Finally, the cultures carried out on starch presented higher FMAT (total mesophilic aerobic flora) We conclude that mixotrophic culture of spirulina will be possible by descreasing bicarbonate supply and compense it with low concentrations of glucose

23. Isolation and characterization of plant growth promoting rhizobacteria from the rhizosphere of date palms in the south of Morocco

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This study aimed to isolate and characterize plant growth promoting rhizobacteria (PGPR) from the rhizosphere of date palms in the south of Morocco The isolated strains were screened for their morphological and physico chemical properties, including tolerance to high temperature, pH, salinity, and drought stress A total of 400 bacterial strains were obtained, all of which exhibited high tolerance to the tested abiotic stressors, indicating their potential as bioinoculants for date palm cultivation in the region Based on the first screening, further investigations will be conducted to evaluate the plant growth promoting and biocontrol traits of the selected PGPR candidates, such as nutrient solubilization, and the production of secondary metabolites and enzymes Overall, this study highlights the importance of exploring the diversity of microorganisms in the rhizosphere and their potential applications in promoting plant growth and biocontrol in challenging environmental conditions

24. Contribution a la valorisation des proteines de lupin : Mise au point des procedes d'extraction et caracterisation de leurs proprietes technofonctionnelles et structurelles

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Plant sources represent an opportunity to meet the protein needs of consumers in order to ensure food security Several prospective studies announce a major constraint on protein sources in the coming decades Thus, to meet future needs in plant proteins from seed splitting, the development of legumes such as lupin would be more important asset Protein extraction techniques can improve or deteriorate structural, physico chemical and functional characteristics of proteins To our knowledge, little information is available on the impacts of defatting lupin flours following the use of different organic solvents on the physico chemical, functional and structural properties of lupin proteins In our study, we investigate different behaviors of lupin proteins using three extraction routes (raw flour, cold and hot defatted flour) We characterize the impacts of these three extraction methods on the physicochemical, functional and structural properties of white and yellow lupin proteins

25. Conception et modelisation d un systeme aquaponique au Maroc

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Aquaponics technology is based on the coupling of RAS with hydroponics (soil less crop culture), in which nutrient rich aquaculture effluent is used to grow plants in hydroponic system Recirculation aquaculture system RAS' is a closed tank based fish farming system, considered as an alternative solution for water consumption by pond aquaculture, due to its land and water low requirements In aquaponics, RAS fish tanks are linked to

hydroponic production beds, whereby plants use nutritional elements dissolved in water, therefore, hydroponic unit serves as a biological filter in order to purify water before sending it back to the fish tanks in a closed system context Aquaponics is a quasi closed food production system that produces both fish and plants without the need of chemicals and pharmaceuticals, using 90% less water than Aquaculture and hydroponics

26. Caracterisation agro morphologique et moleculaire des accessions du sorgho local Mauritanien et la selection pour leurs tolerance aux stress hydrique

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Cet etude se caracterise par une caracterisation agro morphologique et moleculaire des accessions du sorgho local Mauritanien sous l effet du stress hydrique et faire la selection des accessions qui montrent une certaine tolerance au secheresse vue le manque de pluviometrie en Mauritanie et en suite faire une etude moleculaire avec les marqueurs ISSR pour etudier le degre de polymorphisme au sein de cet ecotype

27. Prevalence of Adverse Reactions of Medicinal Plants used in Diabetic Patients at Ibn Sina Hospital in Rabat, Morocco

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Diabetes is a major health issue Medicinal plants (MPs) are commonly used in Morocco To evaluate the prevalence of adverse reactions (ARs) linked to the use of MPs, an ethnobotanical survey was carried out on 384 diabetic patients (DPs) at the Ibn Sina Hospital in Rabat using a semi structured questionnaire, from Jan 8th to Apr 8th, 2018 80 46% of surveyed DPs were women Mean age was 54 42 years Illiterate DPs were the most affected by MPs use and ARs' occurrence Type 2 diabetes clearly predominated (83 86%) 56 50% of DPs used MPs, with 16 13% experiencing ARs: digestive disorders, hyper/hypoglycemia, liver damage, and coma vigil Trigonella foenum graecum L (54 28%), Olea europaea L (14 28%), and Salvia officinalis L (8 56%) were commonly associated with ARs Causality assessment was probable in 29 73% and possible in 37 84% Some ARs resulted from herb drug interactions Study underscored MPs widespread use for diabetes and potential for serious ARs and drug interactions

Thematic 14

Genetic Diversity, Genomes and Bioinformatics

1. Study of the diet of the European otter (Lutra lutra) in a section of the Beht wadi with the Metabarcoding technique

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MAHAMOUD Abdallah/Classified as near threatened in the IUCN Red List, the European otter (Lutra lutra)is part of Morocco s wildlife It is semi aquatic and generally its presence in an environment is an indicator of a healthy environment, which increases the need to know it The study of its diet allows us to better understand its role in the food web However, being a very discreet nocturnal species, it is only through its faeces that it is easy to study its diet The use of Metabarcoding on faeces proves to be a more efficient method to accurately determine prey species It consists of extracting DNA from faeces and amplifying it with conventional PCR with primers can amplify a wide spectrum of species and then align and deduce the prey species This new technique in Morocco, which we applied as part of our research to a population of European otters nesting in a section of the Beht wadi (the work is still preliminary) promises revolutionary results for the study of species discrete

2. Phenotypic characterization of Beldi (local) chicken (Gallus gallus) in Morocco

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The present study describes the variations in morphological characteristics of local chicken (beldi) in Morocco It involved 405 chicken adults distributed on 81 villages; the data collected were analyzed with SPSS The distribution of feathers is very varied, normal (90 6%), silky (8 9%), crested (3 7%), Naked neck (3 7%) and frizzled (0 5%) Feather coloring present more frequently mixtures of colors according to body region (80 5%), and sometimes presented by a single homogeneous color (19 5%), such as: black, red, white, grey or yellow with the frequencies (8 9%), (3 9%), (2 9%), (2 7%), (0 7%) respectively Single comb is more frequent (92 8%), generally red (76 8%) or pink (22 5%) The earlobes are red white (39 5%), red (34 1%), or white (19 5%) Shank color is mainly white (40 3%), yellow (24 4%), black (19 0%), and green (15 3%) The eyes color was mostly orange (86 7%), while brown, yellow, black and red express much lower frequencies (5 4% , 4 9% , 1 5% and 1 5%)

3. Genome scan approach to predict climate response and adaptation of Quercus suber L , in the Maamora forest using specific SSR markers

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Climate change is having a negative impact on locally adapted species, such as cork oak (Quercus suber L), a key tree species in the Mediterranean The Maamora forest is considered the largest forest in the Mediterranean basin with the highest diversity compared to other forests in their area of distribution in Morocco In our study, using SSR markers, we built a database of 240 individuals of the Maamora forest from which we determined signatures of local adaptation, through Genomic Scan approach We were able to detect outlier loci with a potential to be under divergent natural selection pressure, subsequently correlated with the climatic and edaphic conditions of the Maamora The outliers detection, carried out using BayeScan v2 1 software, revealed the presence of outliers loci in Q suber Results received a significant correlation between one of the outliers with environmental variables Our finding provides a potential adaptation of Quercus suber L To climate change

4. Assessing Milk Yield and Fertility Traits in Moroccan Holstein Friesian Cattle: A Comprehensive Analysis Using Univariate and Multivariate Animal Models

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ay be feasible The low heritability estimates for reproductive variables showed that a significant portion of the observed variance in these traits could be attributed to environmental factors or non additive genetic effects Due to the negative association between milk yield and fertility features, a multi trait evaluation of fertility with milk yield is advised to avoid the bias in single trait methods

5. Pb induced metabolomic and Biochemical changes in Hirschfeldia incana

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Hirschfeldia incana, a brassicaceae that grows naturally in Pb contaminated sites and exhibits significant biomass and strong Pb tolerance and accumulation capacity it represents a good model for studying plant response to Pb Metabolomic profile of H incana plants treated with 100M Pb after 3 and 15 days in hydroponic conditions was assayed by GC MS Results showed an increase inorganic acids concentration from the beginning of treatment and a decrease inlipids and steroids concentration, revealing signs of toxicity lipids and steroids concentration increased after 15 days of treatment A comparison of biochemical parameters between treated and untreated plants showed an increase in peroxidase activity in leaves and roots and a decrease in catalase activity in roots after 3 and 15 days of treatment with 100M Pb Sugar and phenol content increased in leaves and roots after 3 and 15 days of treatment These finding will allow to understand more the response of H incana to Pb

6. Phylogenetic analysis of fatty acid desaturase gene family in oil crop species: Implications for functional divergence and quality oil production

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The fatty acid desaturase (FAD) gene family plays a crucial role in the biosynthesis of unsaturated fatty acids, which are essential components of many plant oils The quality of argan oil is influenced by the expression and function of fatty acid desaturase genes In this study, a candidate gene approach was adopted to identify in silico gene sequences of interest that may be involved in oil quality Furthermore, the evolutionary relationships of desaturase genes in several oil crop species, including Argania spinosa L , were investigated using a phylogenetic approach The results indicated that the desaturase gene fam-

ily is conserved across the oil crop species, with the SAD, FAD2, and FAD6 subfamilies being present in all species analyzed Overall, this study provides new insights into the evolution of desaturase genes in oil crop species, with important implications for future research and potential applications as biomarkers in the quality oil production

7. Oxford Nanopore Sequencing a new technology for detecting Multidrug Resistant (MDR) Mycobacterium tuberculosis strains

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The emergence and spread of antibiotic resistant strains of Mycobacterium tuberculosis is fuelling tuberculosis (TB) epidemics, leading to multidrug resistant tuberculosis (MDR TB), extensively drug resistant tuberculosis (XDR TB), and totally drug resistant tuberculosis (TDR TB) Culture based phenotypic drug susceptibility testing (pDST) is considered the Gold Standard for the determination of antibiotic resistance in M tuberculosis but takes long turnaround time, also molecular diagnostic methods like GenoType MTBDRplus and Xpert MTB/RIF have limitations Next generation sequencing (NGS) or whole genome sequencing (WGS) requires high investment and bioinformatic knowledge We use the promising Oxford Nanopore Technology with the MinION sequencer as an attractive approach for use in resource limited settings, thanks to its ease of use, small size and cost effectiveness

8. Comparison of three statistical approaches for feature selection for finescale genetic population assignment in four pig breeds

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Our study aimed to find informative SNPs for distinguishing between four pig breeds using the Illumina Porcine 60 k SNP chip Three statistical methods, including Principal Component Analysis, theLeast Absolute Shrinkage and Selection Operator, and Boruta algorithm, were used to select informative SNPs These methods resulted in three distinct sets of SNPs, with 23 SNPs shared across all three methods, effectively distinguishing each breed Further research should explore the biological pathways represented by the informative SNPs This study shows potential for future applications in other livestock animals PCA preserves as much information about the data as possible when selecting variables

9. Assessment of Retama genetic diversity using ISSR, rep, and ITS RFLP and phylogeny

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In this work, we assessed the genetic diversity among and within species of Retama, using ISSR and rep markers, and ITS phylogeny Hence, a total of 48 and 18 bands were scored respectively for ISSR and rep, of which 83 33% and 88 89% were polymorphic The polymorphic information content values were 0 70 with ISSR and 0 78 with the rep The combined data AMOVA revealed lower variations among (25%) than within (75%) Retama species The ITS sequences analysis revealed that R dasycarpa has 99 83% , 99 01% , and 95 53% similarities with R monosperma, R raetam, and R sphaerocarpa respectively Retama raetam has 98 84, and 95 20 similarities with R monosperma and R sphaerocarpa The ITS sequences phylogeny confirmed the close relatedness between R monosperma and R dasycarpa which were regrouped in the same cluster related to R raetam The principal coordinate analysis (PCoA) and the cluster analysis assembled the different samples into three groups

10. Genetic profiling of antibiotics resistant mycobacterial strains (MDR/XDR), isolated from Moroccan tuberculosis patients, by targeted NGS high throughput sequencing

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Tuberculosis (TB) is a global disease It is one of the leading infectious causes of death The causative agent, Mycobacterium tuberculosis (M tb), is a human pathogen widely distributed in the world In Morocco, the prevalence of this disease is intermediate (31,712 cases in 2018), but there are no nationally representative data on antibiotics resistant strains (MDR/XDR) Targeted next generation sequencing (tNGS) has emerged as a comprehensive method for drug susceptibility testing (DST) of M tb from patient sputum samples for the clinical diagnosis of antibiotics resistant TB We present the results of the first national study based on targeted NGS high throughput sequencing for the genetic profiling of resistant mycobacterial strains isolated from Moroccan tuberculosis patients The results obtained on a cohort of 71 samples show that 25% of the sequenced strains were susceptible to treatment, 57 3% of the strains were classified as MDR and 7 35% of the strains classified as XDR

11. Plant DNA barcoding

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Plant DNA barcoding is a molecular technique used to identify plant species rapidly and accurately, by using a short, standardized DNA sequence from a specific region of the plant genome This technique involves comparing the DNA sequence of a plant sample to a database of known sequences to determine them In this study, DNA was extracted from three different plants, including One tree Ceratonia siliqua, one shrub Chamaecytisus sp, and one herb Vicia sativa, using four methods of extraction The extracted DNA was then subjected to amplification using a total of six primers, two of which targeted the nuclear DNA while the remaining four were specific for chloroplast DNA Interestingly, all six primers yielded a good amplification of the DNA samples, indicating that the extraction and amplification procedures were successful These findings are promising and suggest that the chosen extraction and amplification protocols are reliable methods for future studies on plant DNA barcoding

12. Investigating the Presence of European Otter (Lutra lutra) using Environmental DNA Technique in Bouregreg and Beht Rivers in Morocco

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Environmental DNA (eDNA) technique is used to detect individual species or biological communities in aquatic ecosystems, particularly in scenarios where collection of whole organisms is impossible The objective of the present study is to investigate the presence of Lutra lutra from eDNA water samples with a target qPCR assay using otter specific and universal mammal primers 10 water samples and 1 blank sample were collected from two major rivers (Oued Bouregreg and Oued Beht) in Morocco The filtration process was conducted on site using three different pore size filters (0 45 m, 0 2 m and 0 22 m) Our results showed positive amplicons with the universal mammal primers, indicating the presence of mammal DNA but no detectable Lutra lutra DNA using otter specific primers This lack of detection suggests that there is a high probability of having low DNA concentration of the eDNA of otters in the water samples or the eDNA of the species is not present during the time of sampling

13. Population Structure and genome diversity of Sardi Sheep

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The Sardi sheep breed has improved continuously via phenotypic selection for the last 20 years To further enhance the breed, genomic selection is favored An important first step is to examine its genetic diversity, inbreeding and population structure Whole genome data of 27 Sardi animals from 7 re-

gions were used to infer neutral genetic diversity metrics Using 3 complementary approaches (sNMF, Treemix, and a principal components analysis) the breed's population structure was investigated The breed demonstrated high observed heterozygosity, moderate inbreeding, and moderate nucleotide diversity Population structure results showed that the breed is well homogenized with significant gene flow Some geographic structuring was detected around the origin of the breed Four genetically distinct sub populations were apparent from the maximum likelihood tree To conclude, the Sardi breed s important diversity and moderate inbreeding levels must be considered in genomic selection programs

14. Genomic characterization of Oregano in the Morocco using DNA barcoding

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In Morocco, oregano is a medicinal and aromatic plant named Zaatar widely used for its renowned therapeutic properties However, it is sometimes marketed as a fine powder, which hinders the morphological recognition of this plant Adulteration of oregano is common and highlights the need to develop a molecular traceability system to identify oregano in order to avoid frauds The objective of this work is to study the authenticity of oregano This was done by using eight oregano samples from different Moroccan Genomic DNA was extracted and then amplified and sequenced using two universal barcode regions The sequencing showed that all analyzed samples were authentic except for the Sale sample which was potentially adulterated It was postulated that the DNA barcode approach is strongly recommended to ensure the quality of herbal medicines in general and oregano in particular Further studies using a multiplex PCR method are considered as well as the expansion of the barcoding primers

15. Comparative genomics of Enterobacter hormaechei subsp xiangfangensis MDMC82 isolated from the Merzouga desert: genomic insight into its environmental adaptation and biotechnological potential

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Houda Zouagui, Rahma Zouagui, Azzedine Ibrahimi and Laila Sbabou MDMC82 was identified as Enterobacter hormaechei subsp Xiangfangensis Phylogenomic analysis of 2797 shared genes among E hormaechei strains from different environmental sources showed clear discrimination among the different subspecies Further phylogenomic analyses at the subspecies level revealed that the E hormaechei strains were clustered based on their genomic relatedness rather than ecological niches Pan genome analysis of the available environmental strains of E hormaechei subsp xiangfangensis predicted an open pan genome structure Genome analysis of MDMC82 highlighted the presence of several genes in response to various abiotic conditions, as well as genes involved in carbon starvation, quorum sensing, biofilm formation, chemotaxis, and motility This study revealed the presence of several genes responsible for the resistance and mobilization of heavy metals

16. Functional analysis and comparative genomics of Rahnella perminowiae S11P1 and Variovorax sp S12S4, two plant growth promoting rhizobacteria isolated from Crocus sativus L (saffron) rhizosphere

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Abstract Rahnella perminowiae S11P1 and Variovorax sp S12S4 are two plant growth promoting rhizobacteria PGPR that were previously isolated from the rhizosphere of Crocus sativus L Functional an-

notation of the both strains predicted a large number of genes involved in auxin and siderophore production, nitrogen fixation, sulfur metabolism, organic acid biosynthesis, pyrroloquinoline quinone production, 1 aminocyclopropane 1 carboxylate (ACC) deaminase activity, phenazine production, volatile organic compounds (VOGs), and polyamine biosynthesis Comparative genomic analysis revealed open pan genome structure for both S11P1 and S12S4 The attribution of functional COG categories to the pan genome fractions showed that the higher portions of core, accessory, and unique parts were specialized in the metabolism and transport of carbohydrates and amino acids, suggesting the metabolic versatility of the two strains as effective rhizosphere colonizers

Thematic 15

Biodiversity and Sustainable Ecosystem Management

1. Contribution a la valorisation des champignons basidiomycetes Pleurotus Ostreatus

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Throughout time, Man has used several sources of food and food alternative to live These resources of animal and plant origin are varied and abundant In this diversity of resources, mushrooms are a significant contribution among these mushrooms we can mention the oyster mushrooms The Pleurotus ostreatus is rich in proteins, vitamins, lipids, and carbohydrates The content of these constituents varies depending on the type of substrate and the conditions of the culture It is a perfect saprophyte It can grow on agricultural and forestry organic waste; it has adaptability to various agro climatic conditions The present study intends to determine the suitable substrate that presents the highest rate of colonization of the mycelium since the seeding of the mycelium on a substrate is a fundamental step in the culture of Pleurotus ostreatus

2. Study of the effect of the extraction method on the polyphenols, flavonoids contents, and antioxidant activity of an endemic medicinal plant growing in Morocco

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Aromatic and medicinal plants are used by human being for different needs including food and medicinal or cosmetic needs The aim of the present study was to compare the effect of extraction methods on the polyphenols, flavonoids content, and antioxidant activity of an endemic medicinal plants growing in Morocco The antioxidant activity was confirmed by three methods: 2,2 diphenyl 1 picrylhydrazyl (DPPH), ferric reducing antioxidant power (FRAP), and Total antioxidant activity (TAC) The results showed that the plant is rich in polyphenols and flavonoids, as well it has a potential antioxidant activity also the results showed that the extraction methods has a significant effect on the polyphenols and flavonoids content also have impact of the antioxidant capacity of the different extracts the results suggest that this plant can be used as a new source of the natural antioxidants

3. Gas Chromatography Mass Spectrometric (GCMS) analysis of aerial parts of Caralluma Q and antimicrobial activity

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The majority of herbal medications and the products that are derived from them are frequently made from crude plant extracts that contain a complex blend of various phytochemical components (also known as plant secondary metabolites) These compounds chemical characteristics vary greatly between species The GC MS approach, which was used to analyze the obtained extracts, can be a useful tool for determining the concentration of certain active principles in herbs used The goal of the current study was to antimicrobial, and GCMS analyses of the plant s aerial parts extracts The presence of steroids, terpenoids, alcohols, acids, glycosides, and phenolic Escherichia coli, Pseudomonas aeruginosa, and Staphylococcus aureus have all been reported to be susceptible to the extracts of aerial parts The GCMS examination revealed thirty two chemicals

4. Faculte des Sciences RABAT

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Hair loss is a common problem that affects both men and women worldwide In Morocco, traditional remedies using plants are often used to treat hair loss To better understand the use of these plants,We have developed a questionnaire that asks herbalists about the most important plants used in the treatment of hair loss The questionnaire includes questions about the specific plants used for hair loss treatment, the preparation method,and the treatment duration It also asks about any side effects experienced and the perceived effectiveness of the treatment One of the plants commonly used for this purpose is rosemary The questionnaire asks about the frequency of use and whether it is used alone or in combination with other plants Other plants commonly used include Argan and henna The results of this questionnaire will provide valuable insight into the use of traditional plant remedies for hair loss treatment,and identify any potential safety concerns associated with the use of these plants

5. Differenciation des extraits des graines brunes de Linum usitatissimum issues du Maroc par leurs profils phytochimiques

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Linum usitatissimum, appartenant a la famille Linaceae, largement cultivee pour ses fibres textiles et ses graines oleagineuses Les graines de lin sont caracterisees par des rendements en huile vegetale qui varient entre (19% et 44%) selon la methode d'extraction, de plus la composition en acides gras montre en approximation (73%) d acides gras polyinsatures, et (18%) des acides gras mono insatures, ou le compose majoritaire est l'acide linolenique (52%) suivis par (20%) d'acide oleique En precisant les sterols de ces huiles, Sitosterol et le campesterol predominent la composition en sterols chez le lin avec des pourcentages allant jusqu'a (46% 26%) Afin d'evaluer la qualite de l'ensemble de ces huiles, l'acidite, l'indice de peroxyde, et l'extinction specifique plus le dosage des pigments paraissent les indices les plus performants a exercer

6. Activite biologique et composition chimique de la plante Dittrichia viscosa

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Dittrichia viscosa is traditionally claimed for the treatment of wounds In Morocco, its fresh leaves are crushed and used for topical application The present study aimed to evaluate the wound healing, central analgesia, antimicrobial and antioxidant potential of aqueous, , ethyl acetate and n butanol extracts of the aerial part of Dittrichia viscosa Wound healing activity was evaluated in wistar rat models, including assessment of wound contraction Antimicrobial The results showed significant wound healing ac-

tivity in rats treated with ethyl acetate and n butanol extract of Dittrichia viscosa On the last day of treatment, the n butanol extract showed a higher rate of wound contraction (57 0129 70%), and favorable histopathological changes compared to the control group In addition, this extract was more effective than silver sulfadiazine (SSD),

7. Effet de la torrefaction sur la qualite et l'activite antioxydante de l'huile issue des graines de Cucurbita maxima et Cucurbita pepo (L)

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Methodologie : On a choisi de faire varier la temperature en fonction du temps Le four a ete prealablement prechauffe selon les temperatures suivantes : 150 C, 120 C, 90 C et 60 C Les graines ont ete torrefiees pendant 45 min Un echantillon de graines non torrefiees a ete garde pour etudier la difference entre les temperatures de torrefaction L'huile de courge a ete extraite par presse a froid L'activite antioxydante a ete evaluee par DPPH et ABTS et la qualite des huiles a ete etudiee par rapport a la temperature de torrefaction Resultats : Les resultats de notre etude montrent que la torrefaction affecte de maniere positive l'activite antioxydante des huiles etudiees Conclusion : Les resultats obtenus indiquent que les graines de courge sont une source riche en nutriments La torrefaction affecte de maniere positive la teneur en nutriments des graines de courge ainsi que son activite antioxydante

8. Comparer l impact des techniques d extraction sur la composition chimique et la qualite de l huile vegetale de P americana

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Le but de cette etude est de determiner l efficacite des methodes d extraction en termes de composition chimique et des proprietes physico chimiques de l huile vegetale de p americana, un fruit de la famille lauraceae Pour ce faire, nous avons opte pour deux methodes: une extraction mecanique par presse a froid et une extraction chimique par soxhlet, avec le n hexane comme solvant d extraction Les proprietes physico chimiques des huiles obtenues ont ete evaluees par l indice de l iode, l indice d acide, l indice de peroxydes, l indice de saponification et l extinction specifique Les huiles extraites presentaient une predominance d acide oleique, de sitosterol et d a tocopherols, ce qui en fait une excellente source de graisses insaturees et de vitamine E

9. Antioxidant properties of Rosmarinus Officinalis: Application on Olive Oil

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This work aims to study the effect of added rosemary to olive oils The addition of plants and plant extracts in virgin and extra virgin olive oils is an old practice in civilisations and countries where the consumption of olive oil is a daily habit Rosmarinus Officinalis or rosemary is known for its antioxidant properties thanks to compounds like carnosol, carnosic acid and rosmarinic acid This work follows the state of extra virgin olive oils with and without the addition of the plant and the plant extracts, with data on the oxidation analysis: Peroxide Index, Spectrophotometric Investigation In The Ultraviolet, and an optimized GC MS method to determine the carnosic acid and the carnosol content

10. Natural source of active nutritional ingredients and antioxidants: Fruits of C humilis

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The fruits of C humilis are important antioxidant biosources The present study describes the chemical composition of each part of the fruit, the seeds and the pulp, which is mainly composed of unsaturated fatty acids, of which oleic acid is the major acid The total sterols of the two parts represent respectively 760 19 mg/100g and 357 68 mg/100g, of which beta sitosterol is the major sterol Further, the tocopherol composition is in the range of 1078 21 mg/g and 960 42 mg/g, respectively For the alcoholic extracts, the seeds are the richest part in total polyphenols (TPT) and total flavonoids (TFT), with respective contents of approximately 259 10 mg of gallic acid equivalent per gram of extract (mg GAE/gE), and 74 07 mg of quercetin equivalent per gram of extract (mg QE/gE) The fruits of C humilis have good nutritional quality And therefore, these results are promising to valorize the fruits of the studied taxon as natural antioxidants

11. Nutritional value variability of Moroccan capers of endemic Capparis: Capparis atlantica Inocencio

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This study aims to valorize the Moroccan caper due the characterization of the endemic species capparis atlantica Inocencio (C atlantica) Here we report on the protein, total sugar, fat, fiber, ash, mineral content, and phenolic compounds of wild caper, harvested from 8 locations in two Moroccan regions (Fes Meknes and Safi) The dominant nutrients were total sugar (175 35 52 10%), protein (27 58 2 07%) and lipids (24 771 87%) The fatty acids profile revealed high stearic acid followed by palmitic acid content with minor amounts of linolenic acid, eicosenoic acid, myristic acid and lauric acid (79 88,17 44, 1 40,0 49,0 68 and 0 14 g / 100 g, respectively) Other important nutrients supplied by caper include K, Fe, and Mn (539 10, 611 64 and 145 68 respectively) C atlantica is rich in polyphenols (21 27 to 22 23 mg EAG/g DW), flavonoids (7 27 to 7 30 mg EQ/g DW) compared to tannins (1 91 to 1 93 mg EC/g DW)

12. Comparison and optimization of conventional and ultrasound assisted extraction for bioactive compounds and antioxidant activity from Moroccan Retama sphaerocarpa

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This study aimed to evaluate the phytochemical properties, and antioxidant activity of Retama sphaerocarpa extracts using three extraction methods The extractswere subjected to chemical test for phytochemical constituents such as total phenolic contents and antioxidant activity through DPPH assay The phytochemical screening of this study indicates the presence of polyphenols, alkaloids, flavonoids and saponins for the two studied methods Moreover, the results demonstrated that the hydro methanolic extract obtained by Soxhlet and maceration has shown moderate total phenolic content (154 54 mg AG E/g extract and 121 03 mg AGE/g extract respectively) compared with UAE (215 5 mg AG E/g extract) In the free radical DPPH test, the values of IC50 for soxhlet , maceration and UAE were 178 02 g/ml, 151 4 g/ml and 135 g/ml respectively Thus, this study confirms that ultrasonic extraction may be an ideal, simple and rapid method to obtain polyphenol rich extracts from R sphaerocarpa

13. Influence de la composition chimique sur la conservation des amandes douces et ameres locales de la region d'Aknoul

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Les amandes sont les fruits des amandiers qui appartiennent a la famille des Rosacees et on identifie deux varietes d'amandes : les amandes douces, et les amandes ameres Dans cette etude, differentes extrac-

tions hexanique ont ete preparees a partir de ces graines et ont ete evaluees a l'aide de l HPLC pour une estimation quantitative de la composition chimique en acides gras, en sterols et en tocopherols totaux Les resultats des analyses ont demontre la presence majoritaire des acides Palmitiques (C16:O), Steariques (C18:O), oleiques (C18:1) et linoleiques (C18:2) Ces huiles contiennent aussi un haut et puissant niveau en sterols dont la forme la plus abondante est la Sitosterol Concernantla qualite des huiles des deux varietes d'amandes, dont le dosage colorimetrique des indices d'acide, d'extinction, d'iode et de peroxyde ainsi que la teneur en pigments a revele une influence significative du temps de stockage sur les amandons

14. Degradation of Cosmetic and Edible Argan Oils Post Exposure to UV Light Effect

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This study aimed to investigate the influence of UV light on the chemical composition of cold pressed and artisanal edible and cosmetic oils and to evaluate their qualities and biological activities The oxidative stability of both oils was analyzed by measuring the peroxide value, acid ity, absorptions (E232 and E270), and iodine value The effect of UV light on the degradation of tocopherols, polyphenols, and also chlorophylls, and carotenoids pigments was investigated The variations of these parameters were evaluated during eight hours at room temperature The re sults showed an increase in acidity, peroxide, specific extinction coefficients E232 and E270 over the time of photo oxidation However, a decrease of polyphenols % , tocopherols % , carotenoids % , and chlorophylls % was proved As for the iodine values, they did not have a great influence

15. Valorisation of B aegyptiaca fruit

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The study investigated, biological activities and lipid fraction profiling of the fruit parts of B aegyptiaca Fatty acid composition showed that all extracts were rich in unsaturated fatty acids, with the pulp containing a high proportion of oleic acid(47 2%), followed by the shell (45 9%) and the kernel (41 9%) The linoleic acid content was the same in all three parts the shell was the richest part in phytosterols, with sitosterol being the most abundant phytosterol in all three parts The antidiabetic activity of the fruit parts was studied by inhibition of the enzymes a amylase and a glucosidase The shell and kernel parts showed strong antidiabetic activity against a amylase (IC50 12 15 and 20 15 g/mL) and a glucosidase (289 8 and 133 5 g/mL), respectively In addition, all assay samples possessed remarkable antioxidant activities by three different methods: DPPH, ABTS, and FRAP

16. Approche phytochimque et activite biologique in vitro des extraits de Salvia officinalis cultivee dans la region d Oumazza

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Salvia officinalis est une plante aromatique et medicinale bien connue pour ses caracteristiques pharmacologiques traitant la goutte, les convulsions, les rhumatismes, les ulceres, et l hyperglycemie Durant ces dernieres annees plusieurs etudes ont ete focalise sur cette espece afin de verifier son utilisation traditionnelle L objectif de cette etude etait de determiner les compositions phytochimiques des huiles essentielles et des extraits ethanoliques de la sauge cultivee dans la region d'Oumazza et collectee a different stades phenologiques, ainsi que l etude des activites antioxydantes et des activites inhibitrices enzymatiques in vitro Les composes chimiques de S officinalis ont ete determines par analyse GC MS L activite antioxydante a ete evaluee par DPPH L effet antidiabetique in vitro a ete evalue par l inhibition de

l a amylase et de l a glucosidase Les resultats obtenus dans cette etude ont pujustifie les proprietes pharmacologiques de cette espece cultivee

17. Phytochemical analysis of the methanolic extracts of three Moroccan toxic plants, and the comparaison of their chemical composition when using different extraction methods

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Morocco is so rich with its biodiversity in the world of plants, the aim of this study is to put a light on three toxic Moroccan aromatic and medicinal plants Datura stramonium L, Nerium oleander L and Peganum harmala L, by conducting 3 different methanolic extraction methods, and to put the extracts through a chemical composition analysis with a particular focus on the phenolic and the flavonoids content to have a clear comparaison between the outcome of each extraction method

18. Biological and antioxidant activities of the essential oil of Pistacia atlantic leaves

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The purpose of this study is to determine the chemical compositions of the essential oil of P atlantica leaves as well as to evaluate its antioxidant and biological activities The essential oil was extracted by hydrodistillation with a yield of 0 89% Analysis was carried out by gas chromatography combined with mass spectrometry The most important of which were Terpinen 4 ol (14 28%), cis Muurola 4(15),5 diene (14 19%), a Pinene (10 83%), p Cymene (9 19%), a Sabinene (7 40%) and Cadinene (6 86%) Free radical scavenging activity (DPPH) and ferric reducing antioxidant potency were used to assess EO antioxidant activity IC50 value using DPPH method was 11 50 0 01mg/ml while FRAP value was (12 98 0 03) mg/g The antimicrobial effect of P atlantic leaves EO was also evaluated using the agar well diffusion method SARM strains are more sensitive to EO than S aureus and E coli with an inhibition diameter equal to (10 00) vs (7 8 0 3) and (6 3 0 3) respectively

19. The traditional medicinal knowledge of the Settat region

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An ethnobotanical investigation of the medicinal plant in the Settat region was conducted to uncover and inventory said plants Furthermore, the geographical location of this region makes this site a diverse and interesting resource for such plants

The study attempts to explore traditional applications of medicinal plants by the local population in the Settat region in order to preserve the indigenous knowledge related to the use of natural resources in medication

The aim was also to offer a comparison data between species used by local population of Settat for therapeutic purposes and those used in other regions of Morocco as well as neighboring countries

A total of 42 plant species belonging to 23 botanical families were cited in this survey The highest UV values correspond to the following species: Mentha L , Maruubum Vulgare L caralluma europaea, Ajugaiva L , with corresponding values equal to (UV=0 321),(UV=0 212), (UV=0 183), (UV=0 143), respectively

20. etude de la stabilite oxydative des huiles de noix, sous des conditions de stockage accelere

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Like all vegetable oils, walnut (Juglans regia) oil is chemically unstable due to its unsaturated fatty acids that are sensitive to oxidation, which in turn affects its nutritional quality This study evaluates the oxidative stability of cold pressed, roasted, and unroasted walnut oils under accelerated storage conditions The composition (fatty acids, phytosterols, tocopherols), physicochemical parameters (pigments, K232, K270, acid and peroxide value), and antioxidant activity by DPPH were evaluated over a 60 day period at 60 2 C The results show a slight increase in total phytosterols, tocopherols, acid and peroxide value, and specific extinction coefficients for both oils However, the fatty acid profiles were not significantly affected After two months of treatment, both oils exhibited a stable physicochemical profile, which may be attributed to their high tocopherol content, acting as an antioxidant

21. Valuation of the botanical properties of toxic plants in Morocco

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Reports of intoxications made to the Moroccan Poison and Pharmacovigilance Center (CAPM) show that the use of plants is far from negligible and is practiced in an irrational, anarchic and uncontrolled manner Because they are natural, plants are mistakenly considered safe, and so people use them in various contexts Products are often used as mixtures of plants, the knowledge of which and the requirements for preparation and consumption are not mastered In view of the increasing number of cases of intoxication in Morocco, it seemed necessary to study the nature of these toxic plants and their monographs as well as their epidemiological characteristics In this review, we will focus on the most toxic plants in Morocco

22. Effects of aqueous extract of Zygophyllum Gaetulum on weight gain in rats

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Zygophyllum or Zygophyllum gaetulumis an endemic plant native to southern Morocco This plant is known in Arabic as "Aggaya" and belongs to the family Zygophyllaceae It is used in ethnopharmacology as an antidiabetic, antispasmodic, hypoglycemic, and a remedy against gastric and hepatic pains The aqueous extraction of the aerial part of Zygophyllum gaetulum was carried out by three methods : Decoction, infusion, and maceration The determination of polyphenols was done using Folin and sodium carbonate Flavonoids were determined using ACl3 and CH3COONa The bioassay was conducted in four groups Each group was composed of 6 Wistar rats Our results showed that infusion and decoction are more effective for the determination of polyphenols The treatment of rats with the plant extract induced an increase in body weight compared to controls These results may contribute to the nutritional properties of this plant species and may be useful for the evaluation of dietary information

23. Huile essentielle de l'espece X ; Effet de l'activite antibacterienne et comparaison de son effet avec des antibiotiques

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L'espece X est un remede alternatif et un agent antibacterien Notre objectif estd'identifier la composition chimique et l activite antibacterienne de l HE de l espece X La composition chimique d HEa ete analysee par GC MS Ensuite, nous avons realise l activite antibacterienne par effet microplaque sur 96 puits et partechnique de diffusion sur agar nous avons identifier 89,70% de compositions chimiques ; le compose le plus eleve est l Eucalyptol 30,14% l activite antibacterienne de l HE sur les bacteries etudiees elles ont la meme concentration inhibitrice de

30l/ml Activite antibacterienne par technique de diffusion sur agar, le diametre d inactivation de l HE etait de 10 mm pour Es, Sa et Ps, et 8 mm pour St, Ba Les antibiotiques testes ont une activite antibacterienne superieure a celle de l HE Les proprietes chimiques de l HE de l espece X sont tres efficaces sur les microbes pathogenes

24. Lavandula mairei Humbert essential oil and hydrolate exhibit substantial antioxidant and antibacterial activities

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Lavandula mairei Humbert is a species of the Lavandula genus that is native to the Mediterranean region and has been traditionally used in herbal medicine for its therapeutic properties However, limited research has been conducted on the chemical composition and biological activities of its hydrolate and essential oil (EO) We aimed to identify the chemical components and investigate the antioxidant and antimicrobial activities of Lavandula mairei hydrolate and essential oil The hydrolate and essential oil were extracted using hydrodistillation and subjected to GC MS analysis to identify the chemical components The antioxidant activity was evaluated using DPPH and ABTS radical scavenging assays, while the antimicrobial activity was assessed using microdilution and biofilm formation methods against selected bacterial The results showed that Lavendula mairei hydrolate and essential oil carry a substantial antioxidant and antibacterial activities

25. Bioactive compounds, antioxidant potential, and oxidative stability of peanut (Arachis hypogaea L) oil

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Peanuts are an economically important crop that is commonly used for edible oil production The purpose of this study was to examine and compare the oxidation stability of two cold pressed peanut oil varieties (Val and Vir) The oil samples were subjected to accelerated oxidation for four weeks at a temperature of 60 1 C The degree of change in the characteristic hydrolytic and oxidative lipid values of the tested oils was determined In addition, changes in the content of bioactive compounds, levels of carotenoids and chlorophyll, and antioxidant activity were studied The results showed that the acid value (AV), peroxide value (PV), and concentration of conjugated (E232) and trienes (E270) increased slightly for both oils On the other hand, the levels of carotenoids, chlorophyll, phytosterols, and tocopherol, as well as radical scavenging activity, decreased with storage time However, Val oil showed greater degradation than Vir oil

26. phytochemical screening and Evaluation of antioxydant activity of aloysia citrodora from Morocco

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Aloysia citrodora known under the vernacular name ”lwiza” is a aromatic and medicinal plant of the Verbenaceae family, widely used in traditional medicine in the treatment of asthma, colds, fever and flu, it is also used against flatulence, colic, preventive, indigestion, insomnia and anxiety To this end, it seemed interesting to us to study the chemical composition of the essential oils of the leaves of the Aloysia citrodora plant and to test their antioxidant activity The phytochemical tests carried out by the characterization reactions made it possible to highlight alkaloids, flavonoids, saponosides, sterols, poly terpenes and tannins in the methanolic extract of verbena leaves

27. Ultrasonic formulation of a sunscreen SPF 30 with herbal extracts

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Herbal extracts used in the present study were studied before in many researches. They had a wide range of applications, including cosmetics, agriculture and pharmacology. In this way, the objective was to enhance their cosmetic properties, in particular their photoprotective activity, with the aim of formulating a special sunscreen for dry skin. Ultrasonic emulsion was carried out in order to produce submicron- and nano-emulsions. Finally, the physico-chemical properties of the cream were evaluated. As results, the Sun Protection Factor (SPF) were important and the submicron- and nano sized emulsions offered a very high surface area, which improves skin penetration and the delivery of bioactive substances into the skin layers.

28. Valorization of vegetal biomass waste: Extraction and use of plant protein based biopolymers

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Industrial processing of vegetables, fruits, and crops results every year in the production of significant quantities of residues, whose management represents a great economic and environmental issue [1] Nevertheless,this complex biomass can be exploited to produce value added compounds among them, proteins based biopolymers[2] These alternative biopolymers play various roles in nature derived from plant sources or agricultural wastes such as maize, rice, wheat, potatoes, sorghum,cotton, and barley[3] Protein extraction can be chemically synthesized using conventional extraction or can be produced by a fermentation process, or advanced green extraction technologies [4] Our study aims to provide an overview of proteins based biopolymers from plant waste biomass, a comparison of proteins content from different sources,and various methods of extracting a plant biopolymer used in the literature, and their potential applications develop by biotechnology

29. HPLC DAD ESI/MS phytochemical investigation, antioxidant, and antidiabetic activities of Moroccan R canina extracts

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The objective of this study was the determination of the phenolic composition and the evaluation of the biological properties of the fruits of R canina LC MS analysis of R canina ultrasonic extraction extract can detect new phenolic compounds, such as cinnamic acid, quercetin glucoside, and digalloylglucose According to the results of the Folin Ciocalteu test, the ultrasonic extraction extract presents a concentration (138 47 mg GAE/g of extract) while the maceration and soxhlet extracts 141 10 and 140 49 mg GAE /g of extract respectively According to the antioxidant power tests, FRAP, in which the extract has an IC50 of 30 12 for the DPPH test, for the ABTS test the Soxhlet extract 264 33 mol TE/g extract and according to the FRAP test the extract of maceration 87 26 mg of AAsc/g of extract, the anti diabetic activity, the extract of Sontrode presents a percentage of inhibition of 65 28% for a concentration of 250 g/mL

30. Evaluations of the effect of the extraction solvent on the Antioxidant Activity of Medical Plant Grown in Morocco By Different Methods

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Moroccan ecosystems are rich of a great and diverse floral of aromatic and medicinal plants that could be a potential source in in the discovery of new bioactive compounds with large spectrum of biological activities, one of these activities is antioxidant activity Our study aim was to evaluate the phenolic content, flavonoid content and the

antioxidant activity of a spontaneous medicinal plant from morocco For this study we used a different solvent, also for the antioxidant activity of extracts, their fractions were measured by 2,2 diphenyl 1 picrylhydrazyl (DPPH), ferric reducing antioxidant power (FRAP) the results showed that all test extracts have an amount of phenolic, and flavonoid and good results in all the in vitro methods of antioxidant assays studied but this amount could be change with the change of the extraction solvent used for extraction the results suggest that this plant can be used as a new source of the natural antioxidants

31. Traditional uses and phytochemistry of the five anti infectious medicinal plants most widely used in Burundi

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A survey among Burundian traditional healers was carried out in order to fully repertory the uses of five medicinal plants that are widely cited locally for the treatment of infectious diseases, namely U massaica, M natalensis, S maranguensis, J nyassana and H congolanum A phytochemical study of these plants was also conducted with the objective of identifying their main secondary metabolites Leaves and aerial parts are the mainly used organs and the preparation methods are maceration, decoction, squeezing of juice, drying, powdering and calcination Modes of administration include oral route, dermal route and enema U massaica is the plant that treats the most diseases, followed by H congolanum, M natalensis, J nyassana and S maranguensis All five plants contain terpenoids and sterols; flavonoids are present in all plants except U massaica; saponins and tannins are present in all plants, except S maranguensis Alkaloids are absent in all five plants

32. Euphorbia Honey: Quality Parameters and therapeutic merits

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This work discusses the properties and potential uses of euphorbia honey, which is produced from the plants of the Euphorbiaceae family, particularly from the genus Euphorbia Euphorbia honey is known for its high pollen content from euphorbia spurge (minimum of 25%), which gives it unique physicochemical characteristics and medicinal properties The work covers the quality parameters, potential contaminants, chemical constituents, and risk of adulteration of euphorbia honey, as well as methods for determining its authenticity The aim is to provide an informative overview of this natural resource

Thematic 16

Natural Geological Hazards and Risks

1. Integration of seismicity and gravimetry data for mapping active faults along the Larach Fez axis (Rif belt, Morocco)

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Morocco comparably to other Mediterranean countries, is considered as a country with moderate seismicity The objective of this work, is to know the origin of the seismicity that still and has been recorded between Larach and Fez cities, and to relate it to the active faults or probably to the system of active faults that generate these earthquakes To achieve the goal mentioned above, we used different techniques and methods like seismology and gravimetry, and attempt to produce maps of active faults in the study area For this purpose, we have adopted an approach based on seismic events data collected in the area of interest Gravimetry data between Larach and Fez has been also used First result deduced from seismicity map shows a quite important seismic activity in the study area Processing gravimetry data, we elaborated a gravimetry map, that shows a large scale anomaly trending NW SE in the west part of the external Rif belt between Larach and Fez

2. Approches geotechniques et apport de la tomographie electrique (ERT) pour etudier l instabilite des pentes sur le littoral du Rif interne Etude du versant au PK 176+800 de la Rocade Mediterraneenne

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La circulation le long de la rocade mediterraneenne au nord du Maroc est perturbee en permanence par les mouvements de terrain Plusieurs sections de route se trouvent non praticables a l'occasion de chaque periode de pluie Les versants du Rif, decaisses et remodeles pendant les travaux de realisation de la chaussee sont devenus instables et font l'objet de glissement de terrain non negligeable Dans notre presente etude nous allons s'interesse au troncon de route situe au PK 176+800 entre Oued Laou et Jebha Notre but et d'evaluer le degre d'instabilite du versant etudie Des essais geotechniques in situ et au laboratoire et des investigations geophysique base sur la Tomographie Electrique ont ete effectues pour completer les analyses geomatique effectue par l'equipe de recherche Les resultats obtenus montre l'efficacite des moyens utilises et confirme l'etat d'instabilite menacante du versant en particulier au niveau du glissement de terrain qui a ete repere

3. Lithospheric seismicity of the High and Middle Atlas

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Recent development of Broad Bandstations in morocco over the past 20 years has made it possible to better locate earthquakes, particularly in the Middle and High atlas we were therefore able to relocate more than hundred lithospheric earthquakes whose epicenters are likely to be subcrustal, also by using Spanish and Portuguese stations for some seismic events We have used methods to minimize rms errors as well as vertical and horizontal errors This allowed us to improve the focal depth of subcrustal earthquakes Thus, the results presented seem more precise in their localization which coincides with the zones characterized by negative minimum values of the Bouguer gravity anomaly These deep seismic zones can also be correlated with the Miocene and Quaternary volcanism of the Middle Atlas

4. Apport de la geophysique et la geomagnetique dans la determination des derangements d'exploitation dans le gisement Oulad abdoun

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La geophysique

5. Erosion Risk Modeling Using Morphometric Analysis: A Case Study of the Oued Amter Watershed in Northeast Morocco

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Erosion is a major environmental problem that affects soil productivity, water quality, and land use sustainability In this study, we developed a spatial erosion risk model for the Oued Amter watershed in Morocco using morphometric analysis The study area was delineated using a Digital Elevation Model (DEM), and morphometric parameters, including slope, aspect, and drainage density, were extracted The morphometric parameters were then integrated using a Geographic Information System (GIS) to develop an erosion risk map The model was validated using field measurements of soil loss and showed a high level of accuracy, with an R2 value of 0 89 The results of the study showed that the entire watershed is at high risk of water erosion (90%), while the rest of the watershed is at moderate risk (10%) The proposed methodology can be used to identify erosion prone areas and prioritize conservation measures, such as terracing and reforestation

6. HVSR (Nakamura technique) and MASW methods : a tool for seismic site effects assessment in sedimentary basin

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In Northern Morocco, seismic site effects in general and liquefaction hazard in particular can occur in the event of a major earthquake due to the thick sedimentary cover characterizing the peripheral Neogene basins of the Alboran Sea An example is Martil Plain which was the subject of important economic development during the last two decades In this regard, we present in this study as assessment of seismic site effect hazard through the HVSR method and the Kg index MASW and coredrilling data are also used to complete our analysis and interpret the spatial distribution of Kg maps Our findings suggest more vulnerability to liquefaction in the Southern segment of the basin, which can be explained by the asymmetrical geometry of Quaternary sedimentation, due to tectonic uplift that influences also the surface and subsurface hydrology processes

7. Monitoring and evaluation of the quality and quantity of water resources of Guelmim center to enforce the water provision of the center

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In the context of the generalisation of drinking water supply From where the need, for the development of local resources, to assess better the known resources with diagnosis of the present situation and see if it is necessary to extend the prospecting of groundwater sources to aquifers of a limited extension As part of new approach in terms of water resources clearance, it is planned to conduct studies of water resources quality control and clearing to strengthen the water provision of the center Guelmim, in order to clear new resources, on one hand and to ensure the continuity of existing water supplies, on the other part The present investigation is to be able to identify underground water resources that will be easily accessible at the level of the current water conveyance system This survey will be conducted in a single assignment and according to the two phases of Analysis of the present situation and hydrogeologic summary and Implantation of water capture

8. Signature of an extreme event deposits along the Moroccan Atlantic Coast of Morocco: evidences from Cores and GPR investigations

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High energy waves, especially storms and tsunamis, are often recorded along the inundated coasts by erosional and/or depositional Our main goal was to identify and locate features that might have formed during a reported extreme event (storms, Tsunami) and its effects on the sedimentary of the nearby Cherrat River The ground penetrating radar (GPR) was used to trace the subsurface details in the Oued Cherrat coastal Sand samples were collected from cores along the GPR profiles to understand the sedimentology and mineralogy in the backshore area Study of cores consisted of analysis of grain size distribution and composition These data suggest that this sedimentary archive presents over 90 cm of depth a fine lithology devoid of clasts,while over the last 10 cm, the end of the core is composed of a layer of very bioclastic coarse, the granulometric indices show that it is a facies that shows high energy transport that may correspond to deposition from tsunamis or storms

9. Study of the geomorphological evolution and impacts of the coastal spit of the Moulay Busselham lagoon

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The lagoon of Moulay Bousselham, known as "Merja Zerga" is exposed to the phenomenon of silting which is manifested by the creation of a spit at the level of the pass leading to negative impacts on the fishing activity (reduction of water exchanges with the sea, consequently, the confinement of the lagoon, the reduction of working hours of fishermen and the considerable increase of risks on fishermen related to the difficult conditions of navigation in the pass become very cramped) The present study is therefore part of a perspective that aims at a better understanding of the different risks and their impact threatening the activity of artisanal fishing on the lagoon of Moulay Bousselham This understanding is reflected in the assessment of vulnerability through a spatial analysis approach that has been applied through GIS tools to suggest solutions to this geomorphological problem that impacts the whole activity

10. Les risques sismiques dans les zones urbaines : une etude de cas

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Des tremblements de terre recents, ont mis en lumiere la vulnerabilite sismique des batiments existants Cette vulnerabilite, conjuguee a une concentration importante de constructions erigees avant l instauration de normes parasismiques, accroit les risques sismiques dans les zones urbaines, meme dans les regions ou la sismicite est moderee Pour evaluer la vulnerabilite sismique des batiments, les courbes de fragilite constituent un outil precieux permettant de quantifier les dommages infliges aux elements structuraux et non structuraux Ainsi, dans cette etude, nous nous proposons d evaluer la vulnerabilite sismique d un edifice en beton arme a l aide de ces courbes de fragilite L objectif principal de ce travail consiste a presenter la methode Push over en definissant les differentes notions y afferentes, son but, les hypotheses sous jacentes ainsi que les conditions requises pour son application, en decrivant egalement la procedure a suivre pour la mettre en pratique

11. Mapping Flood Susceptibility and Detection Using Sentinel 1 Remote Sensing Data Case of study: Province of Taounate Morocco

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Floods are one of the most devastating natural disasters that cause damage to human lives, their property and infrastructure Mapping flood prone regions is one of the most crucial tasks in mitigating a flood catastrophe In this study, we investigated the potential of using Sentinel 1 SLC SAR images for identifying the extent of a flood in Morocco s Taounate Province The SNAP software was used for processing two images acquired before and after the flood incident to produce coherence and amplitude images The flood affected areas were identified using the coherence images, and the water depth was calculated using the amplitude images The findings demonstrated that the coherence imagery had a high degree of accuracy in defining the flood area, with an overall accuracy of 92% and a kappa coefficient of 0 87 The field measurements and the predicted water depth from the amplitude images agreed This method may be used to identify and map floods quickly and effectively

12. Rocks response to electromagnetic waves using Ground Penetrating Radar (GPR) methods

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In this research, we present the first results from GPR data, acquired in different types of rocks The main objective of this study is to investigate the response of different rocks to GPR electromagnetic waves GPR is a nondestructive geophysical method that uses radar pulses to image the subsurface We acquired GPR data using a 400 MHz antenna Analysis of radargrams recorded in Miocene formation shows almost a complete attenuation of the signal For data acquired in calcarenites and conglomerates of the Quaternary, we observed good interfaces for the calcarenite down to 2 3 m; while signal in the conglomerates remains weak For the data acquired in the massif limestone of Emsian, reflectors appeared with gentile dips, in accordance with the geology For the data acquired on dry sand in a beach, profiles show great results Layers of sand are clear, with progradation systems, and erosive surfaces sometimes However, in wet sand near to the shoreline, we could not see any reflection

13. Contribution of electrical tomography to clarify the structural organization of the Paleozoic Zone in the Rabat Tiflet region (Morocco)

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The Paleozoic Zone of Rabat Tiflet in Morocco, known for its Devonian limestone exploitation, has discontinuous outcrops and is

often concealed by Miocene layers Geological studies led to conflicting results regarding the structural organization of the limestone bodies, described by some as continuous and others as lenticular This study used electrical tomography in a nearby quarry to detect and follow the limestone s spatial continuity and structural organization The analysis of 2D imagery electrical profiles identified subsurface lenticular bodies with resistivity ranging from 100 to 1500 Ohm m, potentially corresponding to limestone rocks Results were confirmed by a vertical electrical sounding at 6m depth Other geophysical exploration methods are recommended for assessing the limestone s volume and extraction cost

14. Assessment of Drainage Morphometry and Watersheds Prioritization of oued Joumouaa, western Prerif, Morocco

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15. Geological mapping and lineament detection in High Atlas central and Middle Atlas ridges zone from satellite imagery: case of Imilchil Aghbala region

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The Imilchil Aghbala region is situated in the provinces of Tinghir and Khenifra in Morocco and belongs to the High Atlas central and Middle Atlas ridges zone The region is characterized by a structured Jurassic sedimentary series The aim of the study is geological mapping and lineament extraction The acquired images need to be processed to enhance the geological features, and then analyzed to identify and extract geological features such as lithological units, faults, and fractures The geostatistical analysis of the meso Cenozoic terrain fracturing in the region was performed using Landsat 7 ETM+ satellite image analysis Principal component analysis and directional filtering techniques were applied to extract the lineaments The results showed that the lineaments were organized in main directions of NNE SSW to NE SW The fractures were organized into high density networks or corridors, followed by mountain ranges, major faults, and hydrological networks

16. Contribution of the airborne magnetic field to the structural and mineralogical study of Jbel Ougnat Eastern Anti Atlas of Morocco

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The Jbel Ougnat region has undergone multiple tectonic events, and in order to better understand these events, a comprehensive geophysical study was conducted using high resolution aeromagnetic data Geophysical processing techniques were used to identify magnetic lineaments and estimate the location and depth of magnetic sources The results were compared with geological maps and field prospecting data, which allowed the identification of mineralized features among the lineaments The study found that these orientations were related to several tectonic events throughout the geological history of the area, and identified several mineralized zones associated with the magnetic lineaments This study contributes significantly to our understanding of the geological characteristics and history of the area and could have important implications for mineral exploration

Thematic 17

Optimization, Modeling and Applications

1. Les techniques du machine learning appliquees dans le secteur de la logistique

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I applied tabu search algorithm to solve TSP problem in new way, taking into consideration the specifications of the Tabu search algorithm Furthermore, we develop neighborhood structure to ameliorate search efficiency by eliminating the randomness of the swap or inversion neighborhood, we adjust the values of the parameters to get the best results

I used benchmarks extracted from TSPLIB to try our algorithm, and we conclude that our algorithm gives good solutions within a reasonable amount of time,the added value of my work is the way to adapt tabu to TSP, I used a new operator not present in tabu, as well as an initial solution built in a new way

Finally I can say that my current work focuses, on more particular problems in the class of NP complete problems, for example capacited vehicles routing problem with drones (CVRPD), I am studying several mathematical models, which highlight the conditions of routing, the nature of environment and the mode of transport used

2. Calcul de l'energie de deformation durant l'accident de circulation

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Traffic accidents can have devastating consequences, ranging from property damage to serious injury or death Kinematic reconstruction is a technique used to determine how a traffic accident occurred by examining physical evidence and eyewitness testimony This presentation will explore the methods used to reconstruct traffic accidents, including vehicle damage analysis, modeling, and the use of simulation algorithms Mathematical accident modeling involves studying the event (the accident) and then formulating and testing hypotheses that can explain the behavior of the vehicle This work outlines the basic principles of reconstruction and many of the tools used in mathematical modeling, particularly in the crash phase where a new method based on continuum mechanics has been developed to evaluate the amount of energy dissipated in deformation This new method better approximates the amount of energy dissipated in a collision and, consequently, the speed of approach or collision

3. Pedestrians dynamic

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The present work is devoted to the study of the crowds dynamic, in a corridor of length

y = 1 8m and of width x = 1 2m, the pedestrian movement was studied using a microscopic model based on the differential equations, the force based model, which requires four differential equations two to calculate the positions of pedestrians and their derivatives allows to calculate the velocities, its equations allows to simulate well the trajectory of pedestrians pass in the corridor, The counter current motion was then simulated using the same models for symmetrical as well as asymmetric pedestrian flow cases of low and high density

4. Beyond Market Forces: Leveraging Control Theory for Optimal Pricing Strategy Under Price Controls

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Price controls significantly affect pricing strategies in various markets, particularly for new product launches Optimal pricing policies can be challenging to determine under price controls This presentation examines how control theory can be used to develop an optimal pricing strategy for new product launches under price controls, aiming to maximize profit throughout the product s life cycle Analyzing real world data from Apple iPhones, we demonstrate how control theory can model and analyze pricing dynamics We derive the optimal pricing policy and perform sensitivity analysis to evaluate the impact of innovation and imitation parameters on the pricing decision and product diffusion Our findings provide valuable guidance for businesses setting optimal product prices during launch, even with price controls, contributing to pricing strategy literature

5. Amelioration des performances aerodynamiques du rotor Darrieus: modelisation CFD

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Nul ne peut ignorer que ces dernieres annees, les eoliennes a axe vertical (VAWT) sont devenues beaucoup plus importantes dans le domaine de la naissance de l'energie eolienne profitant de sa compacite et sa conformite Les VAWT peuvent etre classes en deux categories principales en fonction de la vitesse du vent, l'efficacite et de l'utilisation En effet, l'etude de modelisation et de simulation numerique ont ete initialisees dans un premier temps pour adapter en priorite le comportement mecanique et aerodynamique du rotor de l'eolienne choisi afin d'optimiser geometriquement sa performance aerodynamique Dans le present travail, nous pensons a une nouvelle conception d eolienne a axe vertical Darrieus qui permet d'ameliorer et de resoudre le probleme de demarrage du turbine et facilite la maintenance

6. Machine Learning for Microclimate Prediction in Greenhouses, A Case Study in Agadir, Morocco

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Abstract: The micro climate within a greenhouse plays a crucial role in crop management, as it directly influences plant growth, development, and overall productivity In light of this, our study explores the use of Machine Learning (ML) methods, specifically supervised learning, in order to predict the micro climate conditions within greenhouses The data acquisition was performed using two power stations, located in a greenhouse in Agadir, one of the Campbell 23X type and the other of the Campbell CR800 By analyzing the data collected, the research focuses on key parameters such as temperature and humidity The application of machine learning algorithms to the collected data resulted in a model capable of accurately predicting the micro climate conditions Consequently, this allows for modernizing agriculture, better control over greenhouse operations, and improved crop management practices

7. A space time spectral method for pricing options in a regime switching economy

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We propose a novel approach for pricing European options in a regime switching economy The option pricing problem is formulated as a set of coupled Black Scholes partial differential equations describing each state in the economy A space time spectral discretization is proposed for the pricing model by using a Legendre tau method in time, and a Legendre Galerkin method for the spatial discretization Furthermore, the numerical stability and convergence of the resulting numerical scheme is investigated Finally, the resolution approach is illustrated with several numerical experiments to prove the efficiency and effectiveness of the discussed approach

8. Apports de la modelisation et de la teledetection dans la prediction du rendement des especes forestiers : cas de l arganier au sud ouest du Maroc

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Argania spinosa, an endemic perennial tree in Morocco, is primarily found in the southwest region between Safi and Sidi Ifni, it s a valuable resource for both the economy and the environment Despite this, research on argan tree fruiting and yield is limited This study aims to address the yield estimation gap by using GIS tools, spatial remote sensing data, and statistical methods to create a model that estimates argan fruit productivity based on climatic variables and tree development status As result, we got two distinct linear models, each with specific parameters The first model is for trees in the high forest regime, with an adjusted R value of 0 69, while the second model is for trees in the coppice regime, with an adjusted R of 0 64 The models are statistically significant and acceptable Their validation reveals that the difference between the observed and estimated values is small, which confirms the validity of these models to estimate the yield of the argan tree

9. Investigation of Subsurface Voids Using Ground Penetrating Radar and Borehole Drilling

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In this work, we investigated a building site located in the Atlantic coast, close to Rabat city The geology of the site is constituted mainly by calcarinite rocks Due to the nature of this rock, and its proximity to the shoreline, there is a great possibility to find voids due to the dissolution of the carbonite in this formation To achieve this goal, we used ten GPR profiles and their corresponding drilled boreholes Analysis of all acquired GPR data shows the existence of voids in some profiles Their shapes and volumes differ from line to line In some radargrams, multiple level voids exist These findings are very important for the safety of buildings that are going to be built in this site These found voids have to be filled before construction of buildings With these results, we could conclude that GPR is an effective tool for subsurface void detection Also boreholes drilling logs allow us to confirm GPR results

10. Numerical Modelling of Cavitation in Elastic Pipe Water Hammer

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This study provides a theoretical and numerical modeling of transient vaporous cavitation in a horizontal pipeline, anchored to the upstream reservoir The model approach is, essentially, based on that of the column separation model (CSM) The basic system of partial differential equations to solve is a

hyperbolic type and adapts perfectly to the method of characteristics This code, allows us, taking into account the unsteady part of the friction term, to determine at any point of the pipe, and at each instant, the average piezometric head, the average discharge and the change in volume of the vapor cavity This study illustrates the effect of the presence of air pockets, resulting in cavitation, on the amplitude of the pressure wave The calculation results are in good agreement with those reported in the literature

11. web SLA: A web based Sign Language Animator

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Sign Language is a gestural language used by individuals who have difficulty using spoken language In this paper we present the work done to bridge the gap between sign language users and spoken language users by developing a web based Sign Language Animator, the developed application supports 4,000 words in four different sign languages: French Sign Language (FSL), British Sign Language (BSL), German Sign Language (DGS), and Greek Sign Language (GSL) The dataset used is from the Dicta Sign project that contains the most frequently used words on a day to day basis in HamNoSys format The developed application supports single word animation, sentence animation, and multiple other functions such as zoom and rotation to allow a better vision over the 3D avatar When compared to other avatar signing systems, our application is more accessible since it provides support to 4 sign languages, and more flexible by allowing users to construct sentences without limitations

12. HYDRODYNAMIC STUDY OF THE HIGH EFFICIENCY ALGAL REACTOR

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The high rate algal pond is a wastewater treatment process initiated and developed by Oswald It is a rectangular pond, characterized by shallow depth, mechanical agitation, combined with the presence of light energy in the effluent, favoring the development of micro algae It is an efficient and inexpensive solution for small and medium sized towns The hydrodynamics of this reactor showed several disadvantages susceptible to affect its purification performance Indeed, we have highlighted dead zones where the flow is stagnant, especially at the bottom of the reactor, which considerably reduces its volume and presents the risk of a deposition of microalgae and biomass Therefore, we have started this research work with the objective to develop a new geometrical design that will improve of the hydrodynamics of these types of reactors A numerical simulation by FLUENT CFD software was performed to study and compare the hydrodynamic characteristics within the two reactor geometries

13. La plausibilite des mesures

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La plausibilite des mesures Les mesures d'un instrument n'ont de valeur que si leur plausibilite est verifiee La mesure du rayonnement est assez complexe De tres nombreux facteurs interviennent, lies a l'instrument lui meme, son etalonnage, l'electronique qui lui est associee, les possibles ombrages, des meteores , les salissures Il est donc tres difficile de donner un guide complet pour controler la plausibilite des mesures Le controle de plausibilite consiste a evaluer si la mesure n'est pas trop grande ou trop petite par rapport a ce qu'on peut attendre dans les conditions rencontrees Cela implique qu'on a etabli des valeurs types Une recherche d'anomalie est ensuite effectuee par des procedes visuels et automatiques laquelle souvent basee sur un calcul de difference entre la mesure et une valeur type attendue Si cette difference depasse un seuil, alors le test est negatif et la mesure est suspicieuse

Thematic 18

Algebra, Number Theory and Applications

1. Somes results of type Gelfand Mazur

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We show that if (E, p), 0 lt; p ; 1, is a unital semi simple complex advertible complete A p normed algebra such that,for every x F r(G(E)), SpE(y) is star shaped domain for every y ; Bx, then E C In the involutive case, we obtain the sameconclusion under the starry hypothesis on the spectrum of eachnormal element of F r(G(E)) If the algebra is additionally hermitian, it suffices to assume that the spectrum of each unitary elementof F r(G(E)) is star shaped domain The case of algebras with aninvolution anti morphism is also considered

2. On time series construted via topological data analysis approach

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Topological data analysis has recently been applied to the study of dynamic networks In this context, an algorithm wasintroduced and helps, among other things, to detect early warning signals of abnormal changes in the dynamic network under study However, the complexity of this algorithm increases significantly once the database studied grows In this paper, we propose a simplification of the algorithm without affecting its performance We give various applications and simulations of the new algorithm on some weighted networks The obtained results show clearly the efficiency of the introduced approach Moreover, in some cases, the proposed algorithm makes it possible to highlight local information and sometimes early warning signals of local abnormal changes

3. Mathematical models of anaerobic co digestion: effect of growth function and mortality of bacteria on biogas production

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Anaerobic co digestion is defined as the simultaneous anaerobic digestion of two or more substrates Mixing several substrates has many advantages In particular, it can increase biogas production In our work, we built a mathematical model to describe the anaerobic co digestion of two substrates, with preference and mortality of bacteria in closed mode The existence and Boundedness of positive solutions are investigated We show that trajectories converge toward a global attractor which is composed of an infinite number of non hyperbolic equilibria The choice of growth functions, for both bacteria, can completely change the performance of the process

Numerical tests are presented to illustrate the theoretical analysis They allow the prediction of the quantities of the initial mixture for a better biogas production

4. On S cohenent rings

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Let R be a commutative ring and S be a multiplicativesubset of R In 2018, D Bennis and M El Hajoui introduced S finitely presented modules and S coherent rings which are S version of finitely presented modules and coherent rings and obtained an S version of Chase s result They proposed an interesting question as an S version of Chase Theorem that characterizes coherent rings in terms of flat modules: How to define an S version of flatness that characterizes S coherent rings similarly to the classical case? Here we present a recent work answering the above question Our investigation yields also some new results on S coherent rings

5. On a result of Kaplansky On spectrally finite locally convex algebras

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We show that a spectrally finite Frechet algebra is finite dimensional modulo its Jacobson radical

6. Calcul fonctionnel analytique reel dans les algebres topologiques hermitiennes

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We define and study real analytic calculus for several variables in hermitian Banach algebras We also introduce weighted algebras analogues of the classical theorems of N Weiner and P Levy on absolutely convergent Fourier series As applications, we obtain two generalizations of N Wiener and P Levy theorems The first one for several functions of a single variable The second for functions of several variables

7. Relative Gorenstein flat model structure

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A model structure on a category is a formal way of introducing a homotopy theory on that category, and if the model structure is abelian and hereditary, its homotopy category is known to be triangulated So a good way to both build and model a triangulated category is to build a hereditary abelian model structure

Let$R$ be a ring and C be a left R module In this talk, we construct a unique hereditary abelian model structure on the category of left R modules, in which the cofibrations are the monomorphisms with $\mathrm{G_C}$ flat cokernel and the fibrations are the epimorphisms with $\mathcal{C}_C$ cotorsion kernel belonging to the Bass class $\mathcal{B}_C(R)$

8. Change of representation and the rigged Hilbert space formalism in quantum mechanics

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Generalized eigenvectors are key tools in the theory of rigged Hilbert spaces Let H be a Hilbert space and let be a dense subspace of H Let A be a densely defined linear operator in H such that DA and A The generalized eigenvectors of A are the eigenvectors of the algebraic dual of A — In the case where is endowed with a topology finer than the norm topology inherited from H, generalized eigenvectors that are continuous may be of great interest We discuss conditions which ensure the existence of representations associated to generalized eigenvectors of A As

an application, we review and refine Bhm s study of the algebra of the quantum harmonic oscillator

9. A new approch on phantom morphisms

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We will give in this talk new results on phantom morphisms, showing how various types of phantom morphisms can be unif i ed under a single framework Our focus is on demonstrating that the majority of existing results hold true in this general context

10. Filtred product on injective objects in Grothendieck categories

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The transfer of the properties of a family of modules to their direct sum or their direct product is a problem that has aroused great interest for more than half a century Thus, it is known that rings as important as noetherians can be characterized in terms of the transfer from injectivity to direct sum: a ring is noetherian if and only if the direct sum of injective modules is an injective module Or the rings are coherent in terms of the transfer of flatness to the direct product: a ring is coherent if and only if the direct product of flat modules is flat In fact, the direct sum is a special case of a larger class of submodules of the product, called the filter product We study which homological properties can be transferred from a family of objects (either modules or objects of a Grothendieck category) to their filtered product

Thematic 19

Analysis and Dynamic Systems

1. A characterization of r convex functions ($r > 0$)

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Following the abstract scheme of Dolecki s Φ convexity, one gives a characterization of r convex functions for $r > 0$ via a set of ln type generating functions

2. Removable Singularities of Separately Holomorphic Functions

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Removable singularities of separately-holomorphic functions are considered More precisely, we prove holomorphic continuation property of a separately holomorphic function in domain D The theoremeon removable of compact singularitesis one of the most important results in the theory of functions in serval complex variables

3. Reflexivity in weighted vector valued sequence spaces

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We deal with barrelledness, distinguishedness and reflexivity properties in various weighted vector valued summable sequence spaces, with weights in the a dual of a perfect scalar valued sequence space A weaker notion of distinguishedness is introduced and characterized A nice example showing the relevance of this notion is provided

4. Numerical modelling of gas production in landfills with acidogenic and methanogenic biomasses

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One of the most important sources of gas emissions is municipal solid waste In the context of renewable energy production and greenhouse gas emission reduction, we are interested in the biogas produced by the decomposition process of organic matter under anaerobic conditions in a controlled landfill We present a mathematical model of anaerobic digestion with acidogenic and methanogenic biomasses Then, we analyze the model and show that an infinite number of non hyperbolic equilibria induce an attractor We give numerical results that highlight the impact of the mortality of acidogenic and methanogenic biomasses on biogas production

5. fractional-order prey-predator model in the presence of the harvesting, competition and toxicity.

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In this paper, we study the dynamic of a fractional-order prey-predator model with Holling type I and Holling type II functional responses in an aquatic environment of two competing species. We incorporate the eect of harvesting and toxic substances by external agents into system. For the proposed model, we research the existence, uniqueness, nonnegativity and boundedness of the equilibria. We discuss the local stability of these equilibria by using Matiginon's conditions, while the global stability is investigated by formulating an appropriate Lyapunov function. Finally, numerical simulations are provided to validate our theretical results and to investigate the inuences of each parameter on the dynamic behavior of the model

6. Measuring and Evaluating the multi compartment vehicle routing problem in dynamic environment using two hybrid Meta heuristics approaches

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In this paper, two complex variations of the classic vehicle routing problem (VRP) are combined together to present a new VRP variant called the Dynamic Multi Compartment Routing Problem (DMCVRP) The aim of DMCVRP is to minimize the total traveled distance, in this type of problems different product types are loaded into a fleet of homogeneous vehicle with multiple compartments, and each compartment is dedicated to a single type of products In this problem, we divide the DMCVRP into a set of standard MCVRP, and we propose and campare two solution approachesfor this problem, the hybrid simulated annealing (HSA) and the hybrid adaptive variable neighborhood search (HAVNS) The experiments results are evaluated and measured with sensitivity regarding some key parameters of the dynamic benchmark solution approaches

7. Optimal control of a bioeconomic model applied to the recovery of household waste

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This paper presents an innovative mathematical model for generating energy from household waste treatment The proposed model is a three dimensional nonlinear system that effectively transforms waste stored in landfills into energy that can be transmitted to a user's network Our main objective is to maximize the energy produced and transmitted to the user's network, and we achieve this by investigating the issue of determining an optimal investing strategy for monitoring the deployment of treatment plants Using Pontryagin's maximum principle, we characterize the optimal investment over a fixed time frame that maximizes the produced energy while limiting the overall production costs We validate and illustrate the efficiency of our suggested strategy using a direct optimization method This paper's findings will be of great interest to energy experts, policymakers, and anyone working on optimizing energy production from waste treatment

8. Fractional Zernike functions

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In this talk, we will consider the Zernike functions and their associated fractional Zernike functions on the unit disc, generalizing the classical Zernike polynomials Some recurrence relations, as well as relationship to other special functions are also given In addition, new generating functions for these disk fractional functions are proved

9. Truncatef matrix moment problem on R and their solution (A recursive approach)

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We show that every truncted matrix moment sequence, can be regarded as intial data of an infinite sequence of matrices

10. Mathematical Modeling of Gastrointestinal Stromal Tumor Growth with Drug Resistance: A Spatial Partial Differential Equation Approach

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In this study, we examine mathematically and through numerical analysis a partial differential equation model for tumor growth that takes into account drug resistance Specifically, we focus on modeling the growth and resistance to therapies of gastrointestinal stromal tumor metastases in the liver, and specifically the resistance to two tyrosine kinase inhibitor therapies (Imatinib and Sunitinib) Using medical images, we develop a spatial model of non linear partial differential equations This model accurately depicts the spatial progression of one particular patient's tumor The first part of the paper proves the well posedness of the model given certain conditions on the initial tumor The second part presents numerical results from simulations and compares them to the clinical data of one specific patient for whom we have complete treatment information, thus validating the model

11. ORDER AUTOMORPHISMS OF THE SET OF UNBOUNDED OBSERVABLES

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Let $S(H)$ be the set of all self adjoint, possibly unbounded operators on theHilbert space H and $S_+(H)$ the set of all positive elements of $S(H)$ We will classifyall order automorphisms of S(H) and $S_+(H)$

12. On dual fractional Hankel transform

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We review the construction of the so called Dual Fractional Hankel transform and we discuss some of its spectral properties

13. Planar poly analytic automorphic functions

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We aim to employ the theory of poly analytic functions to examine distinct categories of non analytic automorphic functions on the complex plane, in relation to the Appell Humbert automorphy factor Specifically, we provide a concrete characterization for the class of planar automorphic functions that are poly analytic, arising as images of holomorphic functions through the creation differential operator Furthermore, we can study the construction of the orthogonal basis for the case of the rank one case

14. Characterization of periodic points set for functions in finite sets

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In this paper, we characterize the set of periodic points for the function f and for commuting functions from the finite set E into it-

self which will be interesting to give the partial answer to the following open question: let F = f1, f2, , fm be a finite number of functions of E into itself How many distinct cardinalities are there of the sets of periodic points for all compositions using all functions in F in any order?

15. Anaerobic digestion process with leachate recirculation in landfills: Mathematical model analysis and perspectives on optimal control

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In the absence of special provisions, the liquid flowing through the mass of waste produces leachate Our mathematical model considers that organic matter is composed of two types of compartments, solubilized and unsolubilized, and that the recirculation of the leachate makes it possible to hydrate the unsolubilized part of the organic matter By describing the two step process, the dynamic system obtained makes it possible to predict the evolution of the quantities of methane and carbon dioxide over time It admits an infinity of non hyperbolic equilibria but presents properties of asymptotic convergence Thanks to this model, by carrying out simulations, we were able to highlight some control parameters For instance, the influence of the leachate s recirculation and of the initial quantity of organic matter on the production of biogas can be formulated as an optimal control problems that we have begun to analyze

16. The method of lower and upper solutions, applied to a system of Stieltjes differential equations describing the dynamics of an exploited fishery

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In this work, we consider a fish population subjected to predator species and seasonal fishing strategy Since the number of fish individuals presents sudden jumps at each hatching time, and also the fished individuals remain constant during the closed seasons of fishing, we suggest a new approach for modeling In this approach, we make use of a system of Stieltjes differential equations in the modeling, and we generalize the existence result established earlier using the lower and upper solutions method, to establish a solution for our model Moreover, this new framework involves a derivation with respect to a left continuous nondecreasing function Thus, not only the right hand side term is more concise but also several properties of the derivator are inherited by the solution To make our model more realistic, we include a functional dependence that gives an estimation of eggs that will successfully hatch

17. Baire functional calculus for bounded locally operators

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We define and study a simultaneous Baire functional calculus for a commutative family of normal bounded locally operators on a locally Hilbert space The most significant properties of this calculus are presented We also provide some applications dealing with locally Hilbert spaces, namely the existence of a particular orthonormal basis

18. Polynomial interpolation

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In this work we are interested in the T product and its uses, in our case we employ it in the polynomial interpolation problem

19. Parametric Anisotropic Elliptic Problems with Variable Exponents and Convections Terms

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In this presentation, we study a class of anisotropic elliptic equations with variable exponents where the nonlinearities may depend on the gradient of the solution We prove the existence of the solution using the surjectivity result of pseudomonotone operators, and under additional conditions on the data, we show that the solution is unique Moreover, we establish the existence of at least three weak solutions using the direct Ricceri variational principle when the nonlinearities do not depend on the gradient

20. New Fractional Operator

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I present new class of fractional operator We give basic properties of this operator and prove some compactness results Then, using some techniques of calculus of va riations combined with theory of Musielak functions, we prove the existence of a nonnegative weak solution for a singular elliptic type problem in a fractional Sobolev space with homogeneous Dirichlet boun dary conditions

21. HMM based Supervised Machine Learning Framework for the Credit Risk Analysis

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This paper presents a hidden Markov model for credit risk analysis and highlights the use of maximum likelihood based estimation methods for models of this type The work focuses on an HMM with multiple sequences, where the observations can consist of either discrete or continuous features We suppose that the credit risk observations assumed to follow from a Markov chain The novelty of this study lies in an application of the observation equation that can model a continuous, binary or count input variables, which simplifies the default probability calculation process The performance of the proposed method was investigated through a computer simulation solving three datasets of credit scoring problems, and it was shown that this risk estimation technique can be efficiently used by financial institutions

22. On some properties of n EP and n HEP operators

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This work, is devoted to n EP and n HEP operators We give some characteristic properties of these two classes and various links with other known classes in the literature, especially the classes of EP , SD, hypo EP and n normal operators

23. Mathematical analysis of a Malaria transmission model with the Lyapunov technique

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It is possible to contract malaria, an infectious illness caused by members of the plasmo- dium family, by being bitten by an infected female Anopheles mosquito. According to the World Health Organization's most recent figure from 2019, there were an estimated 229 million cases of malaria in- fection worldwide. This study aims to examine the local and global stability of the equilibrium points of a mathematical model of malaria sickness that is based on five ordinary differential equations using the traditional Lyapunov method. The disease-free equilibrium point is demonstrated to be locally and globally asymptotically stable when R0 less than 1 and unstable when R0 great than 1. When R0 ¿ 1, the endemic equilib-

rium point is consequently locally and globally asymptotically stable.

24. Using Artificial Intelligence Tools in the Judicial Domain and the Evaluation of their Impact on the Prediction of Judgments

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Information technologies, particularly artificial intelligence, have recently been more incorporated into our society, as shown in the field of justice. The goal is to improve the performance, efficiency, and relationships among the various actors in the judicial system, as well as to contribute to the resolution of court congestion issues, the reduction of costs and complexity of certain jurisdictional tasks, the acceleration of legal file and procedure processing, and, as a result, the facilitation of decision making. The implementation of AI tools in justice is still in its infancy, with only a few countries throughout the world using them. The majority of these already available technologies are advanced search engines or quantitative analysis applications using the past data. Machine learning and natural language processing techniques are mostly used in these tools. Despite their importance and benefits, there is a lack of understanding on how to apply these technologies in the judicial system. Hence the need to identify the different possible uses of these tools in the interest of implementing an intelligent system system of decision-making for the Moroccan Courts.

Thematic 20

Artificial Intelligence and Applications

1. The Synergy of AI and Precision Medicine: A New Era of Healthcare

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Artificial intelligence (AI) has transformed the medical field by enabling the analysis of large amounts of complex data from different sources, such as genomic, proteomic, and clinical data Machine learning and deep learning algorithms have paved the way for advancements in disease diagnosis and prediction, treatment optimization, outcome prediction, drug development, and public health

This poster presents a review of recent literature on the application of machine learning and deep learning algorithms in healthcare, with a focus on precision medicine Our investigation highlights the importance of personalized medicine and the potential for improving patient outcomes

Through our study, we aim to contribute to the development and implementation of artificial intelligence in the medical field, providing insight into the future of precision medicine and the role of AI in transforming healthcare

2. Application of machine learning on drug discovery

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Machine learning has the potential to revolutionize drug discovery by speeding up the process, reducing costs and increasing the chances of success In this paper, the main idea is to take advantage of machine learning algorithms to create an architecture for the drug discovery process This architecture would be designed to facilitate the use of machine learning at every stage of the drug discovery process, from target identification to clinical trials By integrating machine learning into every step, it is hoped to speed up the drug discovery process, improve drug efficacy and safety, and reduce the cost and time needed to develop drugs

3. les techniques de machine learning appliquees dans le secteur de la logistique

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In this study, a new approach to solving the TSP using the Tabu search algorithm is proposed The Tabu search algorithm is applied with a focus on its specifications, and a novel neighborhood structure is developed to improve search efficiency by reducing randomness in the swap or inversion neighborhood The parameter values are adjusted to optimize the algorithm s performance Benchmark problems from TSPLIB are used to evaluate the algorithm, and the results show that it produces good solutions in a reasonable amount of time The added value lies in the adaptation of the tabu search algorithm to the TSP, including the introduction of a new operator not present in Tabu search, as well as a

novel approach to generating initial solutions Additionally, the current work focuses on applying similar techniques to other NP complete problems, such as the Capacitated Vehicles Routing Problem with Drones (CVRPD), by studying mathematical models that consider several factors

4. monolithic to microservices architecture

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Les technologies logicielles evoluent constamment pour faciliter le developpement, le deploiement et la maintenance des applications dans differentes regions En parallele, ces applications evoluent en permanence pour garantir une qualite de service adequate, et elles deviennent de plus en plus complexes Une telle evolution implique souvent des couts de developpement et de maintenance accrus, qui peuvent deviennent encore plus eleves lorsque ces applications sont deployees dans des infrastructures d execution recentes telles que le cloud Aujourd hui, la reduction de ces couts et l amelioration de la qualite des applications sont les principaux objectifs du genie logiciel Recemment, les microservices sont apparus comme un exemple de technologie ou de style architectural qui aide a atteindre ces objectifs

5. MACHINE LEARNING POUR LA PREVISION DES SERIES CHRONOLOGIQUES

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La necessite de prendre une bonne decision dans un domaine que ce soit, se base premierement sur une meilleure etude des donnees qui nous aidera a avoir par la suite une prevision precise permettant d-arriver au resultat voulu Avec l-apparition de l-intelligence artificielle cela est devenu facile grace a leur champs d-etude qui est le machine learning ou ce qu-on appelle l-apprentissage automatique ce dernier se fonde sur des approches mathematiques et statistiques donnant aux ordinateurs la capacite d-ameliorer leur performances a resoudre des taches sans etre explicitement programmes la valeur de l apprentissage automatique est qu il vous permet d apprendre en permanence a partir des donnees et de predire l avenir Dans notre sujet nous cherchant a determiner la stationnarite des series chronologiques on utilisant les methodes de l-apprentissage automatique a fin d-ameliorer la capacite de prevision

6. Knowledge Distillation : an overview

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Knowledge distillation is a technique used in machine learning to train a smaller, more efficient model to mimic the behavior of a larger, more complex model The goal of knowledge distillation is to transfer the knowledge learned by the larger model to the smaller model, so that the smaller model can achieve comparable or even better performance on a given task In this presentation, we will explore the basics of knowledge distillation, including the different types of knowledge that can be distilled, such as soft targets, feature based, and relation based knowledge We will discuss the motivation behind knowledge distillation, which is to create smaller, faster, and more energy efficient models for deployment on resource constrained devices, such as mobile phones and embedded systems We will also cover the key components of knowledge distillation, such as the teacher model, the student model, and the loss function used to train the student model

7. Contextual analysis for Credit Card Fraud detection based on PV DM Model (Paragraph Vector Distributed Memory)

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At present times, developing an accurate and effective prediction model is a key concern for credit card fraud detection domain This major concern poses significant challenges to financial institutions and service providers with regards to the problem of imbalanced data and changes in fraud patterns In this paper, we address these issues by proposing a novel DL model for credit card fraud detection based on the Paragraph Vector Distributed Memory approach (PV DM) Our proposed model involves preprocessing and classification tasks The preprocessed data undergoes classification using the PV DM model and machine learning classifiers to detect the occurrence of credit card frauds or not

8. Plant Diseases Detection Using Complex Networks and Deep Learning

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Vegetables are vital for crop production and human nutrition, but diseases caused by microorganisms pose a risk to plants For this reason early monitoring of plants for infections is essential Complex networks are mathematical models that can help to uncover the underlying structure and dynamics of plant disease networks, including how different pathogens and environmental factors interact with one another Deep learning, on the other hand, has shown promise in analyzing plant disease symptoms from images and can be used to develop accurate and efficient detection models This poster reviews plant disease detection techniques, and presents advanced methods like complex networks and deep learning These techniques improve disease monitoring and management by providing precise and efficient detection methods, reducing crop losses, and promoting sustainable and resilient food systems

9. No reference 3D Point Cloud Quality Assessment using Multi View Projection and Deep Convolutional Neural Network

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In this work, we propose a novel deep learning based method for No Reference Point Cloud Quality Assessment that aims to automatically predict the perceived visual quality of the PC without using the reference content More specifically, in order to imitate the human visual system during the PC quality evaluation that captures the geometric and color degradation, we render the PC into different 2D views using a perspective projection Then, the projected 2D views are divided into patches that are fed to CNN to learn sophisticated and discriminative visual quality features for evaluating the local quality of each patch Finally, the overall quality score of the PC is obtained by pooling the quality score patches

10. Optimal Wind Turbine design based Artificial Neural Network

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This paper propose an efficient decision support model for future Wind Turbines design considering the variability occurred in wind speed Artificial Neural Network (ANN) is the method proposed in this paper to diminish the future Wind potential prediction error compared to the previous measured data A case study was used to validate the performance of ANN in wind speed forecasting Significant results were achieved with a multi layer ANN structure conducting to a valid future Wind Turbine design given by the proposed decision support model

11. Some Machine Learning Methods to Predict Patients with Nasopharyngeal Cancer

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The lymph node metastasis tumor staging system currently has the primary role in predicting the outcome of nasopharyngeal cancer However, it is not sufficient for this type of prediction, as patients at similar stages may have significant clinical heterogeneity and distinct oncologic results Factors affecting the prognosis of nasopharyngeal cancer and the full effect of these factors on the outcome of nasopharyngeal cancer remain an open topic for further research To address these issues, the present paper explored predictive factors for the prognosis of survival using machine learning techniques Our results in this particular case show a 97% accuracy, 100% precision, 90% recall, and 95% for the F1 score, using the Random Forest algorithm as well as the Voting Classifier algorithm

12. Artificial Intelligence and Assessment Generators in Education: A Comprehensive Review

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Artificial intelligence (AI) has significantly advanced in education, particularly in assessment generators This literature review analyzes the impact of AI on assessment generators, including exam creation and execution It provides a historical overview and defines theoretical frameworks and models for AI assisted assessment generators Advantages and limitations, as well as ethical and social considerations, are also examined Through the analysis of selected research, the review presents the current state of research on AI and assessment generators Findings suggest that AI assisted assessment generators can improve assessment quality and efficiency, but concerns about biases and technological constraints exist The review concludes with recommendations for future research and implications for practice This study comprehensively explores the use of AI in assessment generators and its potential to transform assessment practices in education

13. Facial expression video generation based on spatio temporal convolutional GAN: FEV GAN

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In this work, we present our approach, referred to as FEV GAN, for generating videos of the six basic facial expressions (FE), starting from a single neutral facial image and a label indicating the desired FE FEV GAN is based on Spatio temporal Convolutional GANs Previous methods based on such network have shown the capability to generate coherent videos with smooth temporal evolution However, they still suffer from low image quality and low identity preservation capability In this work, we address this problem by using a generator composed of two image encoders The first one is pre trained for facial identity feature extraction and the second for spatial feature extraction The results analysis shows the effectiveness of our approach in generating videos of the six basic FE, while preserving the input identity The analysis also proves that the use of both identity and spatial features enhances the decoder ability to better preserve the identity and generate high quality videos

14. Analysis of different recommendation algorithms

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The recommendation system is one of the most popular applications of artificial intelligence that attracts many researchers worldwide The advent of the Internet era has led to a widespread implementation of recommendation systems in our daily lives There are numerous machine learning techniques that

can be used to implement the recommendation system Among all of these techniques, we discuss content based filtering, collaborative filtering, hybrid content and collaboration filtering, k mean clustering, and Naive Bayes classifier We have exploited these algorithms to the fullest to achieve the best possible accuracy and presented a comprehensive comparative analysis The strength of all these algorithms can be clearly realized by the significant improvement in accuracy, as described by the experimental analysis

15. SOTA of Clinical NLP

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Natural language processing (NLP) is a machine learning toolbox that aims to analyze, understand and generate natural language The latest advances in deep learning contributed to the appearance of robust models They solved problems in diverse domains and facilitated the process of information extraction from documents in multiple fields and industries for user experience understanding, analyzing financial reports, or getting relevant insights from the news In medicine, patients- electronic health records (EHRs) are a rich source of unstructured text found in various document types like pathology reports Clinical NLP models are applied in patient care, disease diagnosis, and drug discovery However, the accuracy and efficiency of model performance are crucial in clinical NLP applications when patient life is the main subject Clinical NLP faces challenges in clinical data accessibility In addition to the complexity of clinical documents that requires specific preprocessing

16. Facial expression recognition using deep learning approach

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"Facial expressions are of great importance in human communication With advances in computer technology, it has become possible to use small devices that tell us about our emotional states Deep learning has shown impressive achievements in the area of facial expression recognition (FER) with its remarkable success several deep learning architectures are being used to improve performance Because of its importance in different fields many studies have been done on facial emotion recognition analysis using different models with different accuracy values "

17. Similarity measurements method impact on fake news detection accuracy

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Abstract: Fake news has become a significant concern in recent times, and detecting it accurately is crucial to ensure the integrity of information shared online One critical aspect of fake news detection is measuring the similarity between news articles In this regard, various similarity measurement methods are available, and selecting the appropriate one is essential to achieve high accuracy This article presents some commonly used similarity measurement methods, including cosine similarity, Jaccard similarity, TF IDF Similarity, Semantic Similarity, and word embedding similarity The choice of the method should be based on the characteristics of the dataset and the task at hand It is essential to experiment with different methods to determine the best one for the given dataset and task Accurate similarity measurement is a crucial step towards effective fake news detection

18. Detecting Alzheimer s Disease using Deep Learning : A Review of Neuroimaging Based Approaches

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Alzheimer s disease (AD) is a degenera-

tive brain disorder with a global impact on healthcare systems Deep learning has shown great utility in detecting and classifying AD providing valuable support to healthcare professionals in making more accurate diagnoses and improving patient care This paper presents a systematic review of recent deep learning applications for detecting and classifying Alzheimer s disease (AD) The review includes studies published from 2020 to 2023 and was conducted using major databases such as PubMed, ScienceDirect, and Scopus Various deep learning techniques, including convolutional neural networks (CNNs) and recurrent neural networks (RNNs), were included in the studies, which used diverse imaging modalities such as magnetic resonance imaging (MRI) andpositron emission tomography (PET) The core ideas behind each work and their performance scores are discussed, with the aim of comparing the accuracy of each technique for AD detection and classification

19. A novel approach to fake news detection applying machine learning classifiers

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The problem of fake news has become a major concern in the current digital era The development of social media platforms has made it easier for both individuals and groups to distribute false information, which has negative effects on society as a whole This study, which compares the effectiveness of six deep learning based models for spotting fake news, is presented in this article We examine CNN, LSTM, Bi LSTM, HAN, Conv HAN, and Bert as our models, based on the ISOT News Dataset According to the trial results, the Bert based model has the best accuracy, at 92 85% The HAN based model is close behind, at 91 23% In comparison to the LSTM based model, the bi LSTM based model obtains an accuracy of 88 92% On the other hand, the CNN based model has the lowest acc (82 51%), while the Conv HAN based model gets the highest acc (85 67%)

20. Using Machine Learning to Predict Public Prosecution Judges Decisions in Moroccan Courts

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The use of Machine Learning in the field of justice aims to make a machine capable of understanding legal texts In Morocco, The Public Prosecution Judges is responsible for representing the community and defending its rights before the courts, and ensuring that the basic interests are respected when the case is brough Therefore, Public Prosecution judges undertake judicial and administrative tasks, they receive citizens, study their complaints and take appropriate decisions In this work, we focus on citizens complaints We have determined the decision making process of prosecutors when dealing with citizents complaints Next, we will establich a dataset of complaints and processing in order to extract important informations and characteristics that can determinat judge-s decision Later, different machine learning algorithms will be applied to the dataset and the final conclusion on the performances of these algorithms will be drawn

21. Contribution au developpement des systemes intelligents

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Dans le but d-une assistance automatique et intelligente basee sur des techniques d-Intelligence Artificielle, nous pensons contribuer au Developpement des Systemes Intelligents notamment en mettant en place un modele de cooperation et de coordination faisant intervenir differents acteurs Ce modele doit etre capable de mesurer le degre de pertinence de chacune des solutions apportees a un probleme donne pour justement permettre aux acteurs de prendre des decisions en connaissance de toutes les contraintes mises en jeu

22. Une approche deep learning pour la classification des battements cardiaques ECG

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Le diagnostic est un processus essentiel pour prendre des decisions eclairees, en particulier dans le domaine medical ou le raisonnement humain demeure le modele de reference La finalite de ce processus est de pouvoir determiner a quelle classe connue un objet peut etre associe ou affecte Par exemple, l electrodiagramme (ECG) est un outil important pour l evaluation des arythmies cardiaques De nos jours, il est possible d utiliser des solutions d apprentissage automatique pour analyser et classer les donnees ECG Les reseaux de neurones, en particulier, sont une approche bien etablie pour le diagnostic et presentent de nombreux avantages La detection precoce des maladies cardiaques peut ameliorer la qualite de vie des patients, c est pourquoi nous avons mene une etude approfondie de la classification des battements ECG Les resultats de cette etude ont ete obtenus a partir de la base de donnees publique "MIT BIH Arrythmia"

23. Comparison of backbone filtering techniques

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The difficulty of seeing and analyzing large scale networks from biological, social, and technical domains has increased due to the significant progress in data collection tools Several structural and statistical backbone extraction methods try to reduce the size of the network while keeping the essential elements Here, we experimentally compare the weighted network s main backbone filtering techniques

24. Model Reduction Using Artificial Neural Networks for Parametric Shape Optimization

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Aerodynamic shape optimization aims to improve one or many aerodynamic objective functionsby the application of numerical optimization algorithms The objective function evaluation usually invokes a CFD solver to evaluate the shape performance which significantly increases the overall time cost Surrogate Modelling proposes to alleviate this burden by building and substituting a Reduced Order Model (ROM) to the high fidelity CFD solver Then ROM is then used to estimate the aerodynamic performance of the shape This work investigates the application of Artificial Neural Networks to build a ROM for airplane wing aerofoil optimization in trans sonic flight conditions The ANN ROM that predicts lift and drag coefficient given shape parameters is coupled to a stochastic optimization algorithm to reduce the drag coefficient for a constant lift coefficient leading to a significant reduction of the overall CPU Time cost without a significant loss of accuracy

25. A Vaccination Strategy Based on Dynamic Community Detection for Epidemic Networks

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Vaccination is a critical measure in preventing and controlling the spread of infectious diseases We propose a novel vaccination strategy that leverages community detection within dynamic epidemic networks and employs centrality measures to identify high impact spreaders in these communities for targeted vaccination By prioritizing the immunization of the most influential individuals in each community, our proposed approach aims to establish a highly vaccinated network

capable of effectively containing the disease spread

26. Predictive hiring for soft and hard skills

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In the nowadays competitive race of finding suitable talented, qualified, bright, and potential personnel to fulfill the needed spot of a vacancy in a sector, human resources face challenges in hiring a suitable candidate as they seek specific requirements mentioned in the Job Description This study proposes a follow up conceptual model of using artificial intelligence to automate the recruitment process for Ph D candidates based on soft skills extracted from CVs, websites, and professional networks to increase efficiency, better decision making, cost savings, and enhanced diversity and inclusion The model utilizes the Support Vector Machine algorithm using different functions to analyze various soft skills, such as creativity, collaboration, critical mind, empathy, and curiosity, to choose which implementations are best displayed The model s effectiveness is evaluated through experiments, and the results demonstrate its ability to accurately predict successful Ph D hires

27. Comparative Analysis of Recurrent Neural Networks (RNN) and Neutrosophy Neural Networks (NRNN) in Arabic Text Sentiment Analysis

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In this study we developtwo techniques to sentiment analysis in Arabic text: Neutrosophy RNN and RNN based models in the first technique we examine neutralities and their interactions with positive and negative parts of a sentence,in the second technique ; we use deep learning techniques to analyze the sentiment of a sentence by evaluating the order of words in the sentence The results demonstrated that the RNN based models beat the neutrosophy based strategy in terms of accuracy 80% and loss 1 84 However, the neutrosophy based technique performed better in recognizing the neutral component of a phrase, which is significant in some applications Overall, the study reveals that the technique used for sentiment analysis in Arabic is determined by the application s unique demands and constraints

28. Comparative Analysis of Recurrent Neural Networks (RNN) and Neutrosophy Neural Networks (NRNN) in Arabic Text Sentiment Analysis

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In this study we developtwo techniques to sentiment analysis in Arabic text: Neutrosophy RNN and RNN based models in the first technique we examine neutralities and their interactions with positive and negative parts of a sentence,in the second technique ; we use deep learning techniques to analyze the sentiment of a sentence by evaluating the order of words in the sentence The results demonstrated that the RNN based models beat the neutrosophy based strategy in terms of accuracy 80% and loss 1 84 However, the neutrosophy based technique performed better in recognizing the neutral component of a phrase, which is significant in some applications Overall, the study reveals that the technique used for sentiment analysis in Arabic is determined by the application s unique demands and constraints

29. Identification of cardiovascular risk factors using ML

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This research study focuses on the development of a system for diagnosing heart diseases using artificial intelligence and machine learning The main risk factors for cardiovascular disease are identified, and a variety of machine learning techniques were used to

predict and categorize the patient with heart disease The SHAP value was used to pinpoint important cardiovascular disease risk factors The model was able to predict signs of having a heart illness in a specific individual by utilizing XGBoost with ENN random undersampling and sratified crossvalidation

30. AutoML approach for decision making in a manufacturing context

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Numerous human and/or machine actors interact in the value chain during a product's life cycle, from its design to its final removal This implies that operational usage data of the product (seen as a system) must then be made available to all stakeholders concerned through efficient informational chains To face large amount of data, Artificial Intelligence and specially Machine Learning technics aim to assist stakeholders in their decision making process However, the latter are not necessarily expert in Machine Learning technics and they have to rely on Machine Learning experts and data scientists to provide analytical assistance To overcome this problem, a new approach called Automated Machine Learning (AutoML) has recently been proposed to save time and increase efficiency by automating traditional Machine Learning steps This paper aims to provide decision assistance model for stakeholders based on AutoML techniques

31. Effects of feature selection with information gain on the performances of some machine learning algorithms Experimentation on CICIDS2017 Dataset

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Feature selectionis an important task of data preprocessing The datasets with a large number of features contain several insignificant features Those irrelevant features affect the computational complexity, increase the amount of resource usage and are time consuming They affect badly the machine learning performances The proposed solution is feature selection The goal is to select relevantfeatures to be usedin order to improve the performances of machine learning algorithms Removing the unwanted features becomes an important task towards a good machine learning model Thisarticle contains four sections Some cybersecurity basicssuch asattacks and threats An overview of the public datasets used in cybersecurity especially the CICIDS2017 The third section is a description of some Machine learning algorithms, tools, criteria and metrics used to evaluate a machine learningmodel In the fourth section, we present our experimentations and their results

32. Applications de Machine Learning et Big Data aux Systemes de Recommandation

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A recommender system is a very specific kind of machine learning system but systems that just recommend values for arbitrary problems that describes machine learning in general that s not really a recommender system per say so the terminology can be a little bit confusing there recommender systems is a very specific thing They re not this general purpose algorithm that can recommend a solution to any given problem You can t think of it that broadly more specifically it s a system that predicts ratings or preferences that a user might give to an item a recommender system is recommending things to people based on their past behavior and the behavior of other people

we re not necessarily recommending a specific rating or preference for an item we might just be recommending a list of items that somebody might like These are also known as recommender engines recommendation systems and recommendation plat-

forms it s all the same thing

33. Robust shape optimization Application to the optimization of an aircraft wing profile

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The optimization of aircraft wing shapes is crucial in the aerospace industry as the aerodynamic performance of wings directly depends on their shape With the advent of numerical simulations, aerodynamic shape optimization has gained momentum as it allows for the evaluation of numerous alternative designs However, this process is computationally expensive as it requires solving Navier Stokes or Euler PDEs multiple times to evaluate the objective functions Furthermore, optimizing for a specific set of conditions may not result in optimal performance designs and can be unreliable To address these challenges, robust optimization strategies incorporate statistics of the objective function to improve off design performances, but this increases the overall time and cost exponentially One approach to reduce computation time is to use surrogate models to approximate the PDE solution, but this introduces uncertainty about the accuracy of the approximation

34. Efficient Anomalous Traffic Detection in Software Defined Networks using Machine Learning

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Abstract The use of software defined networking (SDN) provides greater flexibility and scalability for network traffic management However, it also creates new security challenges that must be addressed One way to address these challenges is by using machine learning (ML) to build intelligent and adaptive Network Intrusion Detection Systems (NIDS) To build an efficient and resource effective ML model, several factors such as algorithm selection, data preprocessing, feature engineering, and model architecture must be carefully considered An effective ML model can monitor network traffic in real time, learn network behavior, and detect malicious traffic patterns that may indicate an ongoing attack This study aims to find a classifier that can efficiently detect anomalous traffic with high accuracy and minimal error rate The Decision Tree Classifier (DTC) outperformed the other three classifiers in this study

35. Artificial Intelligence for seismic risk prediction

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Realistic earthquake prediction is essential for earthquake risk assessment However, due to the complex nature of seismic events, it is difficult to effectively identify the earthquake response and extract indicative characteristics from continuously detected seismic data and requires the determination of time, location, and size of a natural event before it begins These challenges severely impact the performance of traditional seismic prediction models and hinder the development of seismology in general In this context, the objective of our research work is to improve and propose new technologies of AI to obtain efficient detection data and to make predictions of seismic risks in order to make predictions of seismic risks in order to be able to take precautions and preventions to reduce theirdamage and make reliable seismic decisions

36. Effective Machine Learning Techniques for Disease Prediction Review

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Currently, a vast amount of information is accessible, including health information For these data to be intelligently assessed and

the accompanying inventive applications to be produced, artificial intelligence (AI), particularly machine learning (ML) and deep learning (DL), is needed These methods may be used to find patterns in multiple medical data sources, forecast diseases, and support quick decisions that improve patient safety and treatment effectiveness The goal of this review is to demonstrate the effectiveness of various machine learning techniques in detecting diseases In this study, the accuracies of single, hybrid, and ensemble hybrid machine learning algorithms were examined When evaluating the accuracy of each method, the results showed that the hybrid ensemble machine learning methodology was the best for predicting chronic disease

37. Accurate photovoltaic power prediction models based on deep convolutional neural networks and gated recurrent units

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Solar energy is a feasible alternative to traditional sources of energy However, the intermittent and random nature of photovoltaic power generation poses a challenge to the reliable and cost effective functioning of active distribution systems Photovoltaic power forecasting is a critical instrument in solar photovoltaic power plants for improving energy delivery quality to the grid and lowering weather related ancillary expenses This paper proposes a new hybrid deep learning model called convolutional neural network (CNN) and gated recurrent unit (GRU) Convolutional layers have the potential to learn complicated characteristics from raw data automatically GRU layers, on the other hand, can learn numerous parallel sequences of input data immediately The generated prediction model was compared to newly established deep learning based algorithms of CNN, GRU, recurrent neural network (RNN), and long short term memory (LSTM) to test CNN GRU performance

38. Using AI algorithms in Autonomous Motion Trajectory Planning Modeling

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The path planning plays an important role for autonomous systems Efficient comprehension of the surrounding environment and the effective generation of an optimal collision free path are two essential elements to resolve a path planning problem Artificial intelligence permits solving issues related to path planning, where several algorithms are currently implemented for this purpose In this work, we will consider analytically and theoretically four AI algorithms, namely: RRT, RRT*, Q Learning and GAN We will demonstrate the different parameters affecting each algorithm to finally perform a performance analysis for various optimization metrics like execution time through simulation based experiments Besides implementing each algorithm, we present a reliable contribution of parameters by exploring new environments to give a mobile node fixed trajectories for independent and autonomous mobilities

Authors: SADIKI Siham, IBADAH Nisrine, MINAOUI Khalid, CESAR Benavente Peces

39. BIGDATA ANALYTICS FOR OPTIMISATION OF RECOMMANDATIONS SYSTEMS

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Collaborative filtering is a recommendation technique that uses users preferences and behaviors to recommend similar items, products, or services Content based filtering, on the other hand, uses the characteristics and attributes of the items themselves to generate recommendations Finally, hybrid filtering is an approach that combines several recommendation techniques to generate more ac-

curate and personalized recommendations In sum, the choice of a recommendation technique will depend on the available data, the goals of the application and the preferences of the users Collaborative filtering, content based filtering and hybrid filtering are commonly used approaches in recommendation, each with its own advantages and limitations However, our presentation will be based on a fourth option which is very important but neglected by these three categories of algorithms that I will call here foreign filtering

40. Solving partial differential equations in framework of neural networks

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Recently, deep neural network (DNN) models have achieved great succes in Computer vision, pattern recognition, and many other artificial intelligence tasks This leads to the application of neural architectures to resolve partiel differential equations In this works we describes a deep learning based numerical approach to solve partiel differential equation (PDE) Firsteval we give an overview on the Learning Neural Networks framework, and the physics informed neural networks (PINNs) Subsequently, we develop a model based on residual minimization to solve a nonlinear problem having a quadratic growth with respect to the gradient The implementation of this model gave rise to a functional to be optimized by applying a backpropagation algorithm with an adequate choice of the optimizer To approach this problem a solution of typical test problems showed the effectiveness of the proposed model

41. Analyse de donnees par l apprentissage automatique

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Analyse de donnees par l apprentissage automatique

42. Development of sign language reader and interpreter

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Modelling and development of an it solution able to read and interpret the sign language in order to succeed the inclusion of deaf people challenge

Thematic 21

Cryptology and Security

1. IOT Security and privacy Challenges

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The Internet of things nowadays has reached over 13 billion devices comprising sensors, actuators, and different appliances, generating, and sharing massive amounts of data and information over the internet for further processing and analysis This large amount of data streaming from billions of IoT devices leads to security and privacy concerns, enticing attackers to disrupt and compromise IoT networks which imperils the mission of critical infrastructures incorporating these devices in day to day tasks In this respect securing IoT devices against insider and outsider threat with conventional cryptography and security has become obsolete because of many factors like lack of computing and memory power, and protocols heterogeneity To address these challenges, different architectures have been introduced, like Edge and Fog Computing, which bring decentralized and distributed architecture, as well as computing power and storage as close as possible to the users and data sources

2. Audio confidentiality

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Since COVID 19, the means of communication have continued to grow At present, we are increasingly faced with applications that offer the use of audio and video to facilitate communication between individuals Nevertheless, the confidentiality and protection of privacy contained in this type of data is a major problem We propose, then, a hybrid encryption system kind of combination between AES and ECC, allowing to guarantee the confidentiality and privacy exchanged in these audios and to protect their cotenu by making them unreadable The results obtained at the end of our experiments show the efficiency and the performance of this new hybridization comparing with other encryption systems

3. Theorie de Bohm et intrication quantique

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1 Abstract

4. Sybil attack in vanet

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Vehicular Ad hoc Networks (VANET) are a special type of the Mobile Ad hoc Networks (MANET) VANET assure communication between vehicles and the nearest fixed equipment, usually described as roadside equip-

ment With the increasing level of connectivity, many types of attacks are possible to occur in VANET Sybil attack is one of them It consists of multiple identities being produced by a malicious node, therefore all messages that are transmitted to Sybil node are now transmitted to the sybil attacker So that may affect the driver s security and the road safety Therefore, the communication must be more consistent and efficiently transferring data We will discuss the characteristics of Sybil attack in VANETs and the several methods available to detect this kind of attack

5. The Blackhole Attack on Vehicular Network

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One of the most well known security risks in wireless mobile ad hoc networks is the black hole attack Because the route finding procedure is required and unavoidable, the intruders take advantage of the loophole to carry out their nefarious activities Many researchers have experimented with various detection approaches in order to suggest various detection strategies In this study, we review current solutions and explore cutting edge routing techniques We categorize these approaches into single and collaborative black hole attacks, we also assess the categories of these solutions In anticipation, we anticipate providing additional researchers with comprehensive work

6. cybersecurite et veracite de communication de l'automobile connectee/autonome utilisant l'intelligence artificielle

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bstract: The increasing adoption of VANETs in the automotive industry highlights the importance of ensuring the security and reliability of these networks in order to protect human lives on the roads A key aspect of VANET security is the availability of the network, as it is essential for the transmission of vital information between nodes However, the wireless nature of VANETs and the growing deployment of wireless applications make these networks vulnerable to a range of security attacks, including denial of service (DoS) attacks, which can compromise network availability In this article, we provide an overview of DoS attacks in the VANET environment and discuss the severity of their impact on network availability

7. Machine Learning Techniques for detecting DDoS Attacks in SDN envirenement

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In the Software Defined Networking, the control and data planes are decoupled, this separation moves all the smarts to a single point called controller, witch computes the forwarding rules and pushes the rules down to the data plane using an agreed upon control protocol like Open Flow SDN architecture brings numerous benefits, such as programmability, flexibility and a centralized management However, this creates new security concerns and challenges too Distributed denial of Service (DDoS) attacks are one of the most dangerous attacks in SDN This attack can takes place in any component of the SDN, and could cause reduction or complete disruption of SDN services In this paper, we have studied various form of DDoS attacks in SDN framework We conducted a comparative study of a set of Machine Learning techniques for detecting DDoS attacks on the SDN envirenement taking into account the type of DDOS attacks

Thematic 22

Innovation, Technology 4.0

1. Developing a Forex Expert Advisor Based On A New Indicator Model

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Currently FOREX (foreign exchange market) is the largest financial market over the world To begin with, It requires a deep understanding of the markets, a clear strategy, and the ability to remain disciplined and patient in the face of market volatility and uncertainty The model is used to identify trading opportunities and to determine the best time to enter or exit a trade The goal of a trading model is to increase profitability and reduce risk in a trader s portfolio This document outlines the development of a Forex expert advisor based on a new indicator model Our trading model is the combination between of two technical indicators: Relative Strength Index and Triangular Moving Average Bands as well as the price value The proposed EA yields an intriguing result, according to the evaluation s findings using the MT4 platform s strategy tester feature

2. Monitoring system: global views on the approach and existing methods

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The current state of tracking human beings and objects makes it a significant task; it attempts to comprehend the underlying principles of detected objects and humans in order to link them to reliable treaty systems and get the appropriate results In order to track items or people, tracking typically employs a variety of techniques, including graph theory, technology tools, the Internet of Things (IoT), Big Data, and artificial intelligence In this article, we outline the tracking strategies that have been suggested in this direction and then analyze and discuss the various findings

1 Fuentes, A , & Scavuzzo, M (2017) A review of vehicle tracking systems: Towards integration with Intelligent Transportation Systems Journal of Ambient Intelligence and Humanized Computing, 8(1), 5 19 2 Wang, Y , et al (2020) A wearable tracking system for monitoring driver behavior using a smartphone Sensors, 20(17), 4738

3. OVERVIEW OF METAHEURISTIC METHODS APPLIED TO VIRTUAL MACHINE PLACEMENT

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Cloud computing, an offshoot of grid, distributed and parallel computing, is composed of interconnected virtual computers serving as computing resources Cloud providers face a significant challenge in optimizing and configuring the infrastructure, which is further compounded by fluctuations in demand Dynamic adjustment of the virtual machine placement model is preferable to overcome this challenge Some methods consist of dynamically scaling resources to reduce the number of servers, others on optimizing energy consumption The complexity of this

problem requires the use of metaheuristic approaches, which are optimization algorithms capable of solving complex problems without prior knowledge of the search space Metaheuristics have been used for virtual machine placement, each with its strengths and weaknesses, and the selection depends on the specific needs of the problem This work gives an overview of several metaheuristic algorithms used in virtual machine placement in the cloud

4. WordNet Semantic Relations Based Enhancement of KNN Model for Implicit Aspect Identification in Sentiment Analysis

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Sentiment analysis (SA) or Opinion Mining is the process of computationally identifying and categorizing opinions expressed in a piece of text, especially in order to determine whether the writer s attitude towards a particular topic or product is positive, negative, or neutral, according to three levels: document level, sentence level and aspect level One of the most active phases in this field is the aspect based SA level In this paper, we address the aspect identification task that involves implicit aspect implied by adjectives and verbs, on three benchmark datasets of electronic products and restaurant reviews Our approach considers the classification model enhancement for K nearest neighbor (KNN) classifier by the use of semantic relations from WordNet (WN) The experimental findings demonstrate how our approach helps KNN perform better and deal with Overfitting and Underfitting for implicit aspect identification

5. Continuous adaptation intelligent automatic of controller placement problem in SDN

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SDN is a new network architecture that uses various technologies to build flexible, scalable, agile, and easy to manage networks It separates the network into two planes: control and data, providing centralized control and better transfer experience However, compared to traditional distributed architectures, SDN faces challenges in performance, scalability, and reliability The CPP, which refers to determining the number of controllers needed and how to provision them, is a critical issue To address the CPP, DevOps approaches such as Infrastructure as Code, automation, configuration management, and AI(Artificial Intelligence) can be combined to create an advanced system Using the continuous adaptation method, controllers can be placed automatically, quickly, and consistently throughout the SDN network

6. A Methodology for transforming informal language to formal language for of critical systems

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System Engineering (SE) involves integrating project management activities in the design of efficient systems by breaking down their architectural components It is a well coordinated process that aims to address specific requirements To accomplish this, designers use an informal design language, which serves as a framework to assist them in designing all the necessary elements of a system, such as Unified Modeling Language (UML) Our approach involves converting informal language into formal language through a transformation process This process consists of identifying important concepts and terms of both languages, and establishing a set of guidelines and rules for expressing system information using the formal language, which is commonly expressed through mathematical or graphical notations Its benefits include increased clarity, consistency, and accuracy of system descriptions, as well as improved ability to analyze, simulate, and verify system behavior

7. A Survey of Layer Two Blockchain Protocols State Channels and Sidechains

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Blockchain technology has gained significant attention in recent years due to its potential to revolutionize various industries However, one of the major challenges facing blockchain is scalability Layer Two blockchain protocols offer off chain scaling solutions that have the potential to address this challenge In this poster, we present a survey of Layer Two blockchain protocols, categorizing them into State Channels and Sidechains We explore the benefits of using Layer Two protocols, including increased scalability, lower transaction fees, faster transaction times, and improved privacy We also discuss the challenges facing these protocols Furthermore, we examine recent advancements in Layer Two protocols and their potential impact on the blockchain space Overall, this survey provides a comprehensive overview of Layer Two blockchain protocols and their potential applications, highlighting their importance for future research and development in the field

8. Towards a Systematic Approach to Algorithm Choice in Machine Learning

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Choosing the right machine learning algorithm is a challenging task for data scientists, who typically rely on their experience and objective criteria to narrow down a list of candidate algorithms However, the lack of a standardized approach to algorithm selection makes it difficult to evaluate the efficacy of different methods To address this issue, we conducted a literature review to evaluate the state of the art in machine learning algorithm development Our work aims to leverage insights from this review to create a more rigorous and systematic approach to algorithm selection, which will enable data scientists to choose the most appropriate algorithm for a given problem

9. La prediction des problemes des reseaux d assainissement a base de l IA

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A cause d'une grande quantite des eaux pluviales inattendu , les grandes villes marocaines connaissent une crise des infrastructures d assainissement Ce probleme national touche tous les marocains, et nous a incite dans le domaine informatique a reflechir a trouver des solutions pratiques et efficaces pour reduire un tel probleme Notre sujet de doctorat est sur "La prediction des problemes des reseaux d assainissement a base de l IA", on vise a proposer une solution informatique qui aide a predire les problemes d'assainissement liquide en prenant en consideration la rapidite, la fiabilite et l'utilisabilite on se basant sur l Intelligence Artificiel

10. Algorithm parallelisation: Top k and KNN as an example

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Parallelism consists in using a set of processors capable of communicating and cooperating in order to accelerate problem s resolution It is the set of software and hardware techniques allowing the execution of a program using several computing units Top k seeks to select the k most important elements of a data set and KNN consist to find the k closest points to a given point in a data set Both of these algorithms can be parallelized in the same way by dividing the main dataset into subsets and processing each of them on a different processor core or machine, then merging the results to obtain the k most important items in the dataset for Top k and the

k closest points to a given point for KNN Parallelization is complex and requires a good understanding of the algorithm and the hardware architecture But if done correctly, it can improve the algorithm s performance and allow the processing of larger volumes of data in less time

11. A COMPARATIVE STUDY FOR INTRUSION DETECTION WITH IMBALANCED DATASET

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As network technology evolves and Internet services become more widely used, the frequency of cyberattacks has been increasing With the increasing number of individuals and devices connected to the Internet, a significant amount of traffic data is generated, which facilitates fraudulent activities on these networks Therefore, it is crucial to have a system that can analyze traffic data to prevent criminal activity In this article, we introduce multifaceted intrusion detection system (IDS) approaches that address privacy concerns and security threats using in depth learning techniques

12. Embracing Behavioral Biometrics for Enhanced Security in Cloud and IoT Ecosystems

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of cloud computing and the Internet of Things (IoT) has revolutionized the way we interact with technology, offering unprecedented convenience, scalability, and efficiency However, the widespread adoption of these technologies also presents new security challenges, making the need for robust and reliable security solutions more critical than ever Behavioral security, leveraging behavioral biometrics, offers a promising approach to enhance authentication and access control in cloud computing and IoT environments Behavioral biometrics focuses on the unique patterns and characteristics of an individual s actions and interactions with various devices and systems These patterns are inherently distinctive, allowing for authentication and identification of the individual based on their behavior Some common types of behavioral biometrics include keystroke dynamics, mouse movement analysis, gait recognition, voice biometrics, and touch and swipe patterns

13. Chatbots: The Future of Learning

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Natural language processing (NLP) has revolutionized the way we interact with technology and the way we communicate with machines This study explores the use of chatbots equipped with natural language processing techniques to assist students during the learning process in online education The chatbot interacts with students in natural language and provides them with personalized feedback and recommendations based on their queries The purpose of this study is to discuss the effect of a virtual teaching assistant (chatbot) that automatically answers a student s question

14. Generative Adversarial Networks (GANs) for Person Re Identification: A Powerful Image Generator

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Person re identification (re ID) is a challenging task in computer vision that involves matching individuals across different cameras or scenes Traditional methods rely on handcrafted features, which often suffer from limitations in capturing the complex appearance variations of persons With the advent of deep learning, Generative Adversarial Networks (GANs) have emerged as a powerful tool for image generation tasks that consist of a generator and a discriminator trained in an adversarial manner to generate realistic images of people, generally used to augment

training data and improve the performance of person re identification models Furthermore, in this research poster, we propose to utilize GANs as an image generator for person re ID, aiming to overcome the limitations of traditional methods and improve the accuracy and robustness of deep person re ID systems

15. Integrating NLP with User Stories for Agile Software Architecture Choice

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Natural Language Processing has been widely used in the software development process In this poster, we present an approach for integrating NLP with user stories to facilitate software architecture design choices Our approach Use NLP to list software architecture options based on extracted requirements We demonstrate the effectiveness of our approach by conducting a case study in which we use NLP to analyze user stories and then generate software architecture options based on these user stories We then evaluate the generated architecture options and choose the most appropriate Our approach shows that the integration of NLP techniques can significantly improve the efficiency of software architecture design choices and lead to the creation of more effective and user centered software systems Overall, this poster highlights the potential of NLP in software development and emphasizes the impact of using NLP in the analysis of user stories to choose the best software architecture

16. A Taxonomical Comparison of Object Detection and Object Tracking in Intelligent Video Surveillance Systems

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In the computer vision field, the detection and tracking of objects in video surveillance systems have become important research areas due to the need for security and human safety However, it is a challenging task due to scene variations This paper presents a review of some methods used in the detection and tracking of objects in video surveillance systems, such as background subtraction, optical flow, and frame differencing for object detection, and kernel tracking, point tracking, and silhouette tracking for object tracking Finally, a comparison of these methods is provided

17. Enhancing the Utilization of the Skyline Algorithm in the Research and Selection System for Cloud Services

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The popularity of cloud computing has resulted in an increase in the number of available web services, providing consumers with a wide range of options However, with the abundance of cloud services, selecting an appropriate one has become increasingly complex, particularly for non IT users This research aims to address this issue by proposing a cloud service selection mechanism that enables consumers to define their perception of quality criteria amongst the vast number of services available Our proposed approach utilizes the skyline algorithm, known for its ability to select the most dominant cloud service from large databases, resulting in faster calculation of the Skyline and a more efficient and powerful tool Our study discusses the algorithm and presents experimental findings that demonstrate the promising potential of our strategy

18. Method to hybridize two consensus mechanisms in a single blockchain

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The popularity of blockchain technology stems from its decentralized and secure nature However, different consensus mechanisms are used in various blockchains, each with its strengths and weaknesses To im-

prove the efficiency, security, and scalability of the blockchain, this research proposes a method that combines two secure, scalable, and energy efficient consensus mechanisms into a hybrid one By utilizing the strengths of both mechanisms and minimizing their weaknesses, the proposed hybrid consensus mechanism allows faster and more energy efficient block creation and validation, as well as scalability Specifically, the proposed method involves using the first consensus mechanism for block creation, validation and verification and the second for scalability In conclusion, the hybridization of two consensus mechanisms in a single blockchain can lead to a more efficient, secure, scalable and promising blockchain

19. Spell Correction using Neural Networks

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Spell correction is a fundamental task in natural language processing (NLP) that aims to automatically detect and correct spelling errors in text Both LSTM and RNN can be used for spell correction, as they are both well suited for tasks involving sequences of data

In the case of RNN, it can be used to model the sequence of characters in a word and learn the probability distribution over the possible correct spellings given the observed sequence of characters

On the other hand, LSTM is a type of RNN that is designed to learn long range dependencies in sequence data Additionally, LSTM can be used in different ways, such as character level language modeling, sequence to sequence modeling, and attention mechanisms, which can all be useful for spell correction in different contexts

Overall, both LSTM and RNN can be effective for spell correction, but LSTM may be more effective for more complex spelling errors due to its ability to capture long term dependencies

20. Analytic performance between 4G and 5G networks using big data

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After a significant increase in data traffic and the discovery of many limitations of the long term evolution, also known as fourth generation 4G, the world was introduced to fifth generation 5G On the one hand, these limitations concern the latency and the size of the bandwidth for downloading, uploading, and streaming videos online and other features; on the other hand, the need for society to go forward for a better future and aim for a total transformation of the industries and business Relying on the dataset (static, driving state) gathered from the Irish mobile operator consisting of particular metrics, including channel related metrics, context related metrics, cell related metrics, and throughput information The results show that 5G is 100 faster than 4G in some features (e g , frequency band and ultra low latency), creating unprecedented opportunities for consumers and businesses

21. Intelligent video surveillance systems

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Intelligent video surveillance systems have become increasingly popular in recent years, and the deployment of such systems in an edge/fog computing architecture has many advantages Edge computing involves processing data near the source of the data, rather than sending it to a centralized location for processing This reduces the amount of data that needs to be transmitted and reduces latency Fog computing extends edge computing by adding more computing resources at the network edge However, the deployment of such a system in an edge/fog computing architecture can also pose some challenges,In terms of the computation cost, deploying an intelligent video surveillance system in an edge/fog computing architecture can reduce the overall computation cost by offloading some of the processing from the central server to edge/fog devices

22. Real time Sign Language Recognition using Machine Learning and Neural Network

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Sign Language may be a language within which we tend to create use of hand movements and gestures to communicate with other people who are chiefly deaf and dumb This paper proposes a system to recognize the hand gestures employing a Deep Learning Algorithm, Convolution Neural Network (CNN) to map the image and predict the gestures This paper shows the sign language recognition of 26 alphabets and 0 9 digits handgestures of yank linguistic communication The planned system contains modules like pre processing and Our method provides 95 7 % accuracy for the 26 letters of thealphabet extraction, coaching and testing of model and sign to text conversion In this project we have used ML,OpenCV and Tensor Flow to recognize face masks Our dataset got a higher accuracy in recognition Our method provides 95 7 % accuracy for the 26 letters of the alphabet

23. Intelligent Videosurveillance system: People Re identification techniques evaluation based CMC/CDF metrics

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The re identification phase in video surveillance systems aims to identify individuals from different camera views, which is a challenging task due to variations in lighting, pose, and occlusion Two popular Deep Learning approaches for re identification are Siamese networks and Triplet networks Siamese networks learn to compare two input images and output a similarity score, while Triplet networks learn to map images to a feature space where images of the same person are closer together than those of different persons In this comparative study, we evaluate the performance of Siamese and Triplet networks on the task of person re identification using two metrics: cumulative distribution function (CDF) and cumulative match characteristic (CMC) with a dataset of multiple camera views, on the horizon of choosing the best method to be used in a crowded environment and also with occlusion

24. Certificateless scheme based on Elliptic Curve Cryptography in V2X

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V2X (Vehicle to Everything) is a variant of IoT (Internet of Things) In VANET (Vehicular Ad Hoc NETwork), vehicles and roadside units exchange messages using a wireless communication to inform each other about road traffic, prevent potential accidents and manage road traffic Thus, drivers can take precautions and actions to prevent accidents and avoid traffic jam In case of a cyberattack, a malicious node could create traffic jams or even accidents by delivering false information to other nodes in the network As a result, authentication of messages is considered as a critical security requirement in VANET In our research work, a new certificateless scheme is developed which fulfils all VANET security requirements and uses a batch verification to reduce verification time of a series of messages Additionally, we prove that our protocol is secure in the random oracle given the hardness of Elliptic curve discrete logarithm and Elliptic curve computational Diffie-Hellman problems

25. Certificateless scheme based on Elliptic Curve Cryptography in V2X

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V2X (Vehicle to Everything) is a variant of IoT (Internet of Things) In VANET (Vehicular Ad Hoc NETwork), vehicles and roadside units exchange messages using a wireless

communication to inform each other about road traffic, prevent potential accidents and manage road traffic Thus, drivers can take precautions and actions to prevent accidents and avoid traffic jam In case of a cyberattack, a malicious node could create traffic jams or even accidents by delivering false information to other nodes in the network As a result, authentication of messages is considered as a critical security requirement in VANET In our research work, a new certificateless scheme is developed which fulfils all VANET security requirements and uses a batch verification to reduce verification time of a series of messages Additionally, we prove that our protocol is secure in the random oracle given the hardness of Elliptic curve discrete logarithm and Elliptic curve computational Diffie-Hellman problems

26. Sustainable Agriculture through Smart Farming

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This communication explores the advancements in smart agriculture systems and their tracing methods The use of blockchain technology, sensors, and monitoring devices can improve crop yields, reduce environmental impacts, and ensure food safety However, challenges such as data privacy, cost effectiveness, and scalability persist This communication provides insights into the current state of smart agriculture systems highlighting the need for further research and development By incorporating innovative technologies into agricultural practices, we can achieve a more sustainable and efficient food system

27. Literature review for the accuracy of Deep Learning methods for the treatment of Tuberculosis using chest imaging

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Tuberculosis (TB) is a major public health concern worldwide, specially in low and middle income countries Chest X ray imaging (CXR) is used to confirm the diagnosis and the detection of TB To give an accurate interpretation of these CXR, an experienced radiologists are required but unfortunately in many countries there is a lack of them so the diagnosis takes more time To speed the process of the detection of TB a lot of studies were made in order to find an artificial intelligent (AI) models that automates the analysis of CXR Recently, Deep Learning (DL) methods have shown as an promising tool in medical domains In this literature review, we will compare the accuracy of different DL methods, including convolutional neural network (CNN's) models, and we will discuss the impact of the pandemic due to COVID 19 in the progress of these tools and their accuracy So for this reason we picked articles published before and after the pandemic

28. Urbanization of the information systems

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Modern organizations are facing many hard problems resulting from external and internal constraints related to global business competition, fast changing business requirements, accelerated innovation, increasing cost pressures, and regulatory compliance challenges So to face these problems and continue to evolve, they must develop effective solutions The effectiveness of these solutions is linked to the effectiveness of the alignment between business and information technology Many authers have noted that the information systems urbanization is among the most well known approaches defined in the recent years to build agile information systems In this poster we will present the principles of information systems urbanization and its relationship with enterprise architecture

29. Optimizing Energy Consumption in Mobile Edge Computing through Offloading Decisions

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Mobile Edge Computing (MEC) has emerged as a viable solution to reduce battery consumption and time delay in mobile wireless communications However, there are limitations to MEC, such as radio transmission power and bandwidth, which restrict its effectiveness This paper proposes an efficient single user model that can handle multiple tasks with high density computing while minimizing energy consumption The Offloading Decision and Energy Minimization method presented in this paper has been validated through simulation, and the results are highly encouraging By adjusting the values of the power of transmission and local CPU frequencies, the proposed model can improve the effectiveness of offloading while minimizing energy consumption This approach has significant potential to enhance the performance of MEC and address the energy consumption issues associated with mobile wireless communications

30. Developing A Gold Expert Advisor Based On A New Indicator Model

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The gold market is one of the markets that offer high liquidity and ideal opportunities to invest long term However, trading in this market can be hard for some investors, it requires having a trading plan in order to make profits Several traders use market indicators and strategies to analyze the market A strategy helps the trader to make a trading decision (buying/selling) based on predefined rules and information given by indicators Traders can now also use robots to trade automatically in order to avoid several problems that face most traders This Expert Advisor that can analyze the data will trade 24/7 even when the trader is not available, and more importantly, it can trade with no emotions In this research, we propose an EA that trades by following given trading instructions These instructions are based on a new strategy that predicts the gold price and arrives at decisions using information given by two indicators: fractals and Triangular Moving Average Centered Bands

31. Optimization of Education Technologies Adaptive Learning System (SoftSkills)

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The acquisition of soft skills is crucial for personal and professional development in today s fast paced world Online learning platforms have emerged as a popular means of delivering soft skills training to learners worldwide However, adapting the learning content to the individual needs of learners can be a challenging task, resulting in reduced engagement and suboptimal learning outcomes

The authors argue that traditional methods of teaching soft skills are often ineffective and propose a new skill based method for learning soft skills We will examine the importance of soft skills in the professional world and how their teaching can be improved by adopting a competence based approach

This article presents an approach to defining learning objectives based on learning recommendations and competency based learning styles, as well as designing learning experiences that incorporate real world scenarios and problem solving activities

32. People Tracking for Intelligent Video Surveillance Systems

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In surveillance environments, detecting and tracking individuals is a critical task to ensure safety and prevent incidents However, tracking individuals in a video surveillance system can be challenging due to various factors such as lighting, perspective changes, and occlusions In this poster, we present methods for tracking individuals in a video surveillance system The methods use computer vision techniques to detect individu-

als and track their movement across multiple cameras We tested these methods on a dataset of surveillance videos and obtained promising results This poster presents the results of our study as well as implications for real time security and surveillance

33. Artificial Intelligence based Data Encryption

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Protecting data confidentiality remains a critical concern in the ever evolving technological landscape This paper presents a novel approach to data security using artificial intelligence (AI) techniques Specifically, we propose the development of a knowledge based system that combines a range of experiences to form a comprehensive knowledge base The system employs a suite of techniques for processing, classification, and evaluation of experiences to extract valuable insights on their level of security Subsequently, the system selects the most suitable encryption method to meet the communication requirements Our system s results closely resemble expert decisions and even predict the level of security achievable through such exchanges In summary, this paper highlights an AI based approach that improves data confidentiality by optimizing encryption methods

34. Identification of IoT objects in a zero trust context

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Internet of Things (IoT) ecosystems open up to users a vast world of new innovative solutions and opportunities in all areas of daily life, connected health, smart city, connected agriculture, etc The IoT is a big security headache for many reasons By their very nature, these devices are unreliable It s usually not possible to install a security guard on them, and their presence on a network can be difficult to detect because they often don t look like IT In this context, a secure tool for discovery, identification and pairing of IoT objects would contribute to strengthening trust and the overall security of the IoT network must be developed In the literature, various solutions have been proposed to solve the problem of identification such as PUFs , with the analysis of data linked to the GAP and and GATT protocols for BLE objects To create such a tool, an in depth study of the identification and matching functions, through the principles of "Zero Trust", is an essential step

35. Data quality improve through Outlier detection

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The Internet of Things (IoT) is rapidly transforming the way we collect and analyze data in various industries However, ensuring the quality of IoT data is crucial for reliable and accurate analysis IoT sensors are typically used to collect data on various physical or environmental parameters, such as temperature, humidity, and pressure However, these sensors may occasionally produce outlier data points, which are significantly different from the rest of the data and can adversely affect data analysis and customer satisfaction Therefore, outlier detection is a critical step in IoT data quality control Several outlier detection techniques are available These techniques involve identifying data points that are significantly different from the rest of the data Effective outlier detection in IoT data can improve data quality and increase the accuracy of analysis, leading to better decision making in various domains

36. 5G technology revolutionizes smart cities: a study of its impacts and opportunities

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5G technology, because of its high bandwidth and low latency, could have a significant impact on smart cities by enabling

more advanced and faster services and applications The main contribution of 5G technology on smart cities is: Smart mobility: 5G will enable real time communication between vehicles, pedestrians and city infrastructure, which will ease traffic flow and improve road safety Vehicles will also be able to exchange information with city infrastructure to avoid traffic jams 5G technology can contribute to the evolution of smart cities in several ways such as: Ultra fast connection: 5G offers much faster connection speed than 4G Internet of Things (IoT): 5G can support a much higher number of connected devices In sum, 5G technology can help make cities smarter, providing opportunities for advanced services and applications to improve the efficiency of urban services

37. BIGDATA ANALYTICS FOR OPTIMISATION OF RECOMMANDATIONS SYSTEMS

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Collaborative filtering is a recommendation technique that uses users preferences and behaviors to recommend similar items, products, or services Content based filtering, on the other hand, uses the characteristics and attributes of the items themselves to generate recommendations Finally, hybrid filtering is an approach that combines several recommendation techniques to generate more accurate and personalized recommendations In sum, the choice of a recommendation technique will depend on the available data, the goals of the application and the preferences of the users Collaborative filtering, content based filtering and hybrid filtering are commonly used approaches in recommendation, each with its own advantages and limitations However, our presentation will be based on a fourth option which is very important but neglected by these three categories of algorithms that I will call here foreign filtering

38. Thompson automata for Extended to multi tilde bar Regular Expressions

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The aim of this work is to extend the family of Thompson automata associated with Extended multi tilde bar Regular Expressions The Thompson automaton is a popular representation of regular expressions used in various applications, including text processing, pattern recognition, and computational linguistics Otherwise, EmtbREs are regular expressions augmented by new operators, the so called multi tilde bar operators that allow efficient constructions of small automata for the associated extended expressions Moreover, they are shown to be superpolynomially more succinct than standard expressions Our construction algorithm extends the traditional Thompson automaton by incorporating new operations, at the same time, it preserves all of the properties of the standard Thompson automaton In this work, we provide a detailed description of our algorithm and prove its correctness and efficiency Furthermore, we give a linear word recognition algorithm on extended Thompson automata

39. Automating Recruitment Process using NLP: A Novel Approach for Efficient and Accurate Candidate Selection

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Recruiting the most suitable candidate from a large number of resumes within a given time frame can pose a significant challenge, and traditional methods might not be appropriate To solve this, we propose a novel approach that utilizes machine learning and natural language processing techniques to match resumes to job descriptions by automatically detecting skills This ap-

proach streamlines the recruitment process in Morocco and utilizes a skill extraction module that leverages both Named Entity Recognition and Word2Vec techniques We also analyze CVs with TF IDF and Doc2Vec algorithms to improve the accuracy of the matching process between CVs and job descriptions This approach enhances efficiency and reduces the risk of omitting crucial information Although the current focus is on the computer science sector, we plan to expand our approach to other industries in future work

Thematic 23

Telecommunications & Signal Processing

1. Deployment of nodes in wireless sensor networks

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The ease deployment of Wireless sensor networks (WSNs) in the harsh and hard environment possesses a paved because the way it is They are formed by sensor nodes which are responsible for examining environmental and corporal conditions to perform data processing In this chapter, the manner of deployment will be presented, and how they communicate over a wireless link to unite the necessities of a specific application will be shown

2. Automatic detection of Moroccan coastal upwelling from chlorophyll a concentration images using the Expectation Maximization method

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The inshore water along the Atlantic coast of Morocco is part of one of the four major upwelling systems in the world This region is characterized by the presence of upwelling activity almost all years around In this work, we propose an unsupervised algorithm for identifying and extracting automatically this vital zone using the satellite observation of chlorophyll a concentration (CHL a) In fact, the approach is started with the application of Expectation Maximisation algorithm for detecting the nutrient rich region over CHL a image Then, a region growing algorithm is applied to remove the noisy structures appeared in the offshore waters not belonging to the upwelling region The proposed methodology is tested over a database of 230 weekly CHL a images spanning the period from the years 2016 to 2020 The results show that the proposed method seems to be applicable for any other ecosystem

3. A novel centrality based measure for in fl;uential nodes detection in social networks

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The identi fication of in fl;uential actors on social networks plays a crucial role inthe circulation of information Many approaches have been proposed to identify in fl;uential actors in recent years Totake into account the structural properties of nodes, we choose to apply themeasures of centrality because of their simplicity and efficiency In this papier WE propose a measure that focuses mainly on the degree of nodes and which takes into considerationthe global characteristics of the network, namely, the paths of di fferent lengths We study the validity and robustness of the proposed measure using Spearmanand Pear-

son 's correlations in five benchmark datasets Successful experiments ofthe proposed measure show its e ffectiveness compared to the classical centralities Results show good correlative performancein di fferent real world networks compared to other centrality measures

4. Glass Based Parasitic Slot Antenna for unlimited lifetime 1U and 2U CubeSat Missions

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In this work, a transparent slot antenna is proposed for 1U and 2U CubeSats The constructed antenna is low profile and presents physical size suitable for all CubeSat structures Moreover, this study introduces a tradeoff between two electromagnetic / CubeSat aims The first one is about space for the CubeSat solar panels, which is preferred to be wide for producing the maximum energy possible The second aim is about the use of the CubeSat top face for increasing the peak gain at an operating frequency The proposed configurations are designed and optimized using FEM and Quasi Newtonian method of ANSYS HFSS The obtained results prove that the antenna gain is increased by about 7 0 dBi and 8 0 dBi for both 1U and 2U CubeSats, respectively In addition to that, the whole CubeSat configurations give large 10 dB BWs of about 600 MHz at X Band In general, the developed slot antenna presents high performances that make it very suitable for unlimited lifetime CubeSat missions at X band

5. Augmented perception for autonomous Vehicles

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By using the mesoscopic network structure, this study proposes a general backbone extraction framework In fact, many actual networks consist of dense parts of nodes known as communities, multi core, or components We suggest extracting the backbones from each of the different components of these groups separately and then fusing them to address the heterogeneity of these groupings The effectiveness of the suggested approach versus classical techniques, which are agnostic to the mesoscopic structure of networks, is demonstrated by experimental studies on real world networks

6. The security of clinical sharing of radiological images

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The sharing of radiology images has become essential for efficient healthcare delivery, but it also raises concerns about patient privacy and data security In this abstract, we will discuss the importance of ensuring security in radiology image sharing and some measures that can be taken to achieve it

Patient data breaches can occur through unauthorized access, accidental disclosure, or cyber attacks This can lead to identity theft, financial loss, or even medical harm to the patient Therefore, healthcare organizations must prioritize data security by implementing secure image sharing protocols and complying with regulatory requirements

the security of radiology image sharing is critical to protect patient privacy and prevent data breaches Healthcare organizations must implement secure transmission protocols, encryption, access controls, and regular security training to ensure data security and compliance with regulatory requirements

7. New approach of interoperability between different blockchain networks

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The new Approach of Inter Communication Blockchain aims to present a fresh

perspective on achieving interoperability between different blockchain networks Interoperability has been a longstanding challenge for the blockchain industry, limiting its potential for broader adoption and use cases The proposed approach utilizes a bridge blockchain to create a seamless connection between different blockchain networks In the article will delve into the design and implementation of the bridge blockchain, including the consensus mechanism, transaction routing, and security measures Moreover, the article will showcase a use case scenario to demonstrate the functionality and effectiveness of the proposed approach By highlighting the advantages of the proposed approach over existing methods The proposed approach will be presented in detail in the final article, starting with an overview of the bridge blockchain and how it functions as an intermediary between different blockchain networks

8. Designing AIS Link based on Software Defined Radio for LEO Satellites

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The Automatic Identification System (AIS) was developed by the International Maritime Organisation (IMO) in order to improve the safety of navigation However, AIS devices allow the identification of vessels in the vicinity within a limited range (1520 nautical miles) Therefore, CubeSats can be employed as a space based AIS system to relay ships with shore stations with a higher range of detection In this paper, an AIS link design based on software defined radio between vessels in the Moroccan territorial sea and a specific ground station in Rabat is proposed The AIS data is received by satellite via a highly integrated software defined radio (SDR) over very high frequency (VHF) channels and downloaded to the ground station via an S band transceiver as a data communication subsystem This paper focuses on the preliminary process of designing the link budget and the orbit design using AGI Software Tool Kit (STK) and the AMSAT IARU Link spreadsheet

9. Artificial intelligence applied to the Parkinson 's disease diagnosis

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Parkinson s disease is a complex neurological disorder caused by the dopamine degradation These disorders strongly affect the articulatory gestures of speech which is under the control of the central nervous system For the diagnosis of Parkinson s disease, the doctor focuses on simple aspects of the patient s voice production, such as pitch, intensity and rhythm The artificial intelligence use will allow better diagnosis of patients For this, we compared two algorithms based on the KNN and the decision tree allowing to classify between patients with Parkinson s and those not affected We were able to reach an accuracy of 98% in the case of KNN

10. Saliency based point cloud quality assessment method using aware features learning

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This study deals with a saliency based noreference (NR) method for 3D point cloud quality assessment For this purpose, we firstly compute 3D visual saliency map for each distorted point cloud Then, we use a threshold based filter to select the most salient points From these, we extract both geometrical a perceptual attributes Estimates of their statistical properties (Mean, Standard Deviation, Median, Skewness, Kurtosis and Entropy) form a features vector Finally, the Support Vector Regressor (SVR) is used for the features learning and the quality score prediction To validate our method, a set of experiments are conducted on an open subjective colored point cloud dataset (SJTU PCQA) Results show that the proposed quality assess-

ment method outperforms some competing methods in terms of correlation with average opinion scores

11. The similarity between movie scripts using Multilayer Network Laplacian Spectra Descriptor

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In this paper, we investigate the performance of the graph distance measure Network Laplacian Spectra Descriptor in comparing the similarity between movie stories We rely on a multilayer network model to extract three entities of networks (Characters in Scenes, Dialogue Keywords, Scene Location) Then, we compute the distance between the layers regarding the three aspects We investigate the effectiveness of the measure using the 3 cycle movies of the Scream Saga

12. High Gain Metal Only Planar Antennas for 3U CubeSats

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In this research work, we propose low profile metallic planar antenna systems for use on CubeSats at Ku band Our proposed contributions aim to design lightweight copper based planar configurations of 3U CubeSat antennas The proposed antenna systems are configured and optimized at Ku Band using ANSYS HFSS and Quasi Newtonian Method In addition to that, these studies introduce the use of a 3U CubeSat top face as reflector for increasing the antenna gain and so the target of deep Satellite orbits using developed antenna configurations The achieved results show that these metallic anten na configurations present good impedance matching, wide bands and high gains at Ku Band

13. Characterization of electromagnetic coupling with cables buried in stratified soil

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The subject in progress, concerns the study of the transient response of an incident EM field coupling to underground multiconductor transmission lines (UMTLs) in the presence of a stratified soil by calculation of transient currents and voltages in order to highlight the effect of the stratification on the response of the UMTLs for a given excitation and in the case of a coupling EM in the framework of the quasi TEM approximation

Currently new iterative methods were utilized to overcome a particular eigenvectors problem known as Mode switching while using modal transformation the accuracy of these methods was examined by comparison with other authors

Next an improved quadrature approach will be used to obtain directly the transient response that will be compared with the modal transformation, in addition a new direct evaluation in time domain will be presented The use of Laplace transformer will allow us later to compare the accuracy of the two approaches

Thematic 24

Geosciences, Water and Environment

1. Contribution de la methode geophysique a l'evaluation du potentiel minier dans le sud est de la boutonniere de Saghro, Anti Atlas Oriental, Maroco

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Le massif de Jbel Saghro fait partie du domaine de l Anti Atlas oriental, qui present de fortes indications minieres Dans cette etude, nous mettons en evidence l utilisation de donnees magnetiques aeroportees dans la partie sud est de la boutonniere de Saghro pour la cartographie litho structurale et mineralogique Les resultats montrent des directions similaires aux structures tectoniques generales de la region Les directions NW SE et WNW ESE a E W sont dominees par des failles hercyniennes, tandis que la direction NE SW est liee a la phase pan africaine tardive Les cartes de lineaments magnetiques interpretees indiquent de nouvelles failles profondes dans cette region, tout en confirmant d autres failles deja mises en evidence par des enquetes geophysiques anterieures Notre carte synthetique des lineaments magnetiques sert de guide pour les futures explorations minieres

2. Geodynamique du Carbonifere inferieur de Tisdafine, a la frontiere meridionale de la Meseta marocaine : Evolution paleo environnementale, stratigraphique et structurale

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L etude des spores et des pollens isoles pour la premiere fois dans les series carboniferes non datees du bassin de Tisdafine, permet : la distinction entre un Tournaisien et un Viseen dans les ensembles greso pelitiques anterieurement attribuees au seul Viseen ; des indications de modalites de remplissage sous une dynamique sedimentaireen cycle de progradation retrogradation

3. MORPHOMETRIC CHARACTERISTICS OF THE OUED RHERIS WATERSHED (SOUTH EAST MOROCCO)

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The Rheris watershed is characterized by an arid to semi arid climate, with a large increase in population and demand for natural resources The fatal problem of desertification is posed in terms of adapting the needs of the population to the constraints of the environment to maintain sustainability or the capacity to develop resources The situation of the

Rheris basin in the South East of Morocco is exposed to the risks of desertification, in this sense, the challenge is to assess the sensitivity of this watershed to desertification through the state of deterioration of the environment This could be achieved by monitoring the dynamics of biophysical phenomena related to desertification They are mainly followed by studying the evolution of the climate and the architecture of the hydrographic network in the area of interest But before starting this approach, it is important to study the characteristics of this watershed

4. Modeling groundwater quality by coupling artificial intelligence and remote sensing

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At present, groundwater quality is under threat due to inappropriate use and increased human activity in recent decades This study tends to propose a selection of machine learning methods (support vector machine, random forest) adapted to the mapping and modeling of groundwater quality in MOROCCO, as well as to evaluate the contribution of remote sensing to provide input data to these models We consider in this context major ions such as calcium (Ca 2+), magnesium (Mg 2+), potassium (K+), sodium (Na+), bicarbonate (HCO 3), chloride (Cl), sulphate (SO 4 2), carbonate (CO 3 2), nitrates (NO 3), and variables from remote sensing such as (slope, altitude, topographic moisture index, curvature, rainfall, land use map), these variables are represented as input variables to the model in order to produce groundwater quality susceptibility maps that will involve earth observation satellite data and machine learning

5. L'UTILISATION DU SOL ET L ETALEMENT URBAIN DANS LE CAS DE LA VILLE DE RABAT AU MAROC : APPROCHE INTEGRE PAR TELEDETECTION, MODELISATION GEOSPATIALE, DEEP ET MACHINE LEARNING

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Actuellement, le mecanisme d urbanisation est devenu un theme de reflexion primordiale, dont le taux d urbanisation avoisinera 70% en 2050 a l'echelle mondiale, pendant qu il a ete de 54% en 2014 et 30% en 1950 Selon la Bank mondiale aujourd'hui, 60 % des Marocains resident dans les zones urbaines, contre 35 % en 1970 D ici 2050, pres des trois quarts de la population du pays vivront dans les villes Parallelement a la concentration de la population, l urbanisation entrainera une concentration croissante des activites economiques dans les villes, qui representent aujourd hui environ 75 % du PIB du pays et 70 % des investissements au niveau national A ces effets, en compte tenu de l'evolution technologique incroyable, notamment la creativite des solutions numeriques et intelligentes pour les smartes villes Le present document est realise dans le cadre du projet de cartographie d'utilisation des sols de la ville de rabat au Maroc

6. Basement structure of the Tinghir Errachidia Boudenib basin (Pre African Trough, Morocco)

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The Tinghir Errachidia Boudenib basin, located in the easternmost part of the Pre African Trough in Morocco, has been studied to highlight the basement structure of the basin The three major basement highs, Tinghir Tadighoust Errachidia, Goulmima Aoufous, and Aoufous Tazzouguert, trend-

ing NE SW, E W and NE SW, respectively, are mainly associated with the minimum depth ranging from 848 m to 2000 m The highest depth of the basement is observed in the South of Boudenib and Bouanane, as well as nearby Errachidia at a depth exceeding 8 km, forming two large sub basins The basement structure of the Tinghir Errachidia Boudenib basin is configured in two large deep sub basins separated by basement highs, which fits perfectly with the direction of the alpine orogeny inherited from the Variscan shortening phase in the Paleozoic period The thick sedimentary series deposited in both major sub basins may represent a potential area for hydrocarbons exploration

7. The conceptual hydrostratigraphical model of the Tinejdad Touroug aquifer

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The Tinejdad Touroug aquifer represents two main captive aquifers of quaternary and infracenomanian age The quaternary aquifer has a maximum depth of 30m, it is composed of alluvium, limestone and conglomerates while the infracenomanian aquifer reaches a depth of 212m, it is constituted by the red facies which are clays, marls, sandstones and sands These two aquifers are in discordance on the palaeozoical basement which is composed by impermeable facies The stratigraphical sections of the boreholes play a necessary role in determining the nature of the sedimentary rock units and their spatial distribution in the study area One of the first tasks of a regional hydrogeological mapping project is to define the hydrostratigraphical framework which is defined as a conceptual flow model

8. Modeling the risk of landslide in the Tamdrost watershed Settat, Morocco

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The working methods employed to develop this study represent a combination, which is hoped to be successful, of classical and modern methods Field research has been the most important, and the laboratory has been neglected due to lack of resources Thematic maps were produced, such as the geological map, slope exposure map, slope map, and land use map As a second step, specific maps were made for each factor taken into account The information obtained was previously coded on the maps, meaning that the primary (basic) data were reclassified into specific categories, to which a risk susceptibility score was added Then, the layers of reclassified information were assembled on a synthesis map, according to the elements taken into account A mathematical formula was applied to determine the closest possible proportion of each factor and its level of susceptibility to risk phenomena on the surface of the study area

9. Mineralogical characterization and fluid inclusion investigation of the mineralization of the Jbel El Machhot eastern anti atlas

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The Mechhot Cu Ba Pb deposit is in eastern Anti Atlas at the Maider basin, with Precambrian and Paleozoic formations The Mechhot area is the Upper Ordovician sequence, folded during the Variscan shortening and faulted in a NE SW trend The latter direction controls the ore mineralization in the Mechhot area Ore minerals include chalcopyrite, bornite, covellite, chalcocite, galena, malachite, hematite, chrysocolla, cuprite, barite, pyrolusite, and quartz (Amethyst), with chalcopyrite and bornite linked to H2O NaCl hydrothermal precipitation Supergene alteration led to covellite, chalcocite, malachite, hematite, chrysocolla, and cuprite precipitation A preliminary fluid inclusion study on quartz indicated a homogenization temperature of 119 130 C, a salinity of 14 5 19 8 wt% NaCl, and a Te range of 37 to 23 C The deposit is associated with super-

position events that led to hypogene mineral precipitation and supergene alteration

10. Calcul du bilan Hydrologique de la nappe phreatique plio Quaternaire du plateau de Meknes

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Afin d'evaluer et gerer la planification des ressources en eau souterrain du plateau de Meknes, et de determiner la suffisance de la nappe phreatique plio Quaternaire du plateau de Meknes pour repondre a la demande en eau du plateau de Meknes, on effectue un bilan hydrologique, ce dernier permet d'identifier l'impact potentiels des activites humaines sur la nappe phreatique, etles zones de recharge et decharge des ressources en eau souterraine Le bilan hydrologique depend de la region, les donnees sur les precipitations des debits des cours d'eau, les niveaux de la nappe phreatique et l'evapotranspiration

11. Contribution of aeromagnetic mapping for studying the North Middle Atlas Accident and neighbouring anticline ridges during the Maastrichtian (South West, Middle Atlas, Morocco)

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This study highlights the role of the North Middle Atlas Accident (NMAA) and associated anticlinal ridges in the development of the sedimentary basins: Baqrit Timahdit Guigou, Bou Anguer, Ain Nokra, Oudiksou, Tighboula during the Maastrichtian, and the contribution of aeromagnetic mapping to the identification of the depth of the NMAA and associated structures on the distribution of the sedimentary series Thus, the analysis of the aeromagnetic data of the south western part of the Middle Atlas has allowed the characterization of magnetic anomalies, to identify the depth, dip and emplacement of these faults, based on the geomagnetic examination Several treatments were applied to the map of the study area: reduction to pole, horizontal gradient and Euler deconvolution, which allowed us to confirm the dip of the major fault: North Middle Atlas Accident, previously mapped in the geological map of the South Western Middle Atlas Range

12. Contribution a l evaluation des potentialites du Maroc dans le stockage geologique du CO2

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Le stockage et la sequestration de CO2 dans les couches geologiques profondes est une technique envisagee pour isoler ce gaz dans un milieu profond pendant une longue duree de confinement estimee par des milliers d'annees, afin d'eviter l'augmentation de son taux dans l'atmosphere car il s'agit d'un gaz a effet de serre responsable du rechauffement climatique Cette etude proposera une methodologie de comprehension de la faisabilite technique du stockage geologique de CO2 dans les formations poreuses du bassin d'Essaouira Agadir qui s'etend sur 20 000 Km et qui renferme de differents reservoirs geologiques appropries au stockage de ce gaz, et ceci en faisant intervenir les methodes sismiques permettant l'exploration du bassin a travers l'interpretation des donnees enregistrees sous forme de profils sismiques et la determination de la geometrie du bassin

13. les geomateriaux de la region de rabat sale kenitra et la geologie regionale de region

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les geomateriaux ou les mineraux industriels sont des matieres premieres naturelles non metalliques et non energitiques , formes dans des environnements geologiques parti-

culieres et tres varies sous formes de roches , plus ou moins consolidees , dures ou friables , impermeables ou poreuses ,les formations geologiquesde sol et de sous sol de la meseta occidentales marocaines qu ont ete utiliser comme des geomateriaux se distinguent par une grande diversite liee a leur nature petrographique et a leur composition geochimiques , la valorisationde ces materiaux est beaucoup plus imporatnte et elle a une bonne rentabilitee sur l economie de region

14. Evaluation of the geothermal potential in the eastern region of Morocco

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Geothermal energy has become a focal point of research due to its clean and renewable characteristics and can be used as an alternative energy to fossil fuels for district heating and electricity generation Yet, it remains underused worldwide and certainly in Morocco, at least not on an industrial scale Indeed, the approaches developed depend on the availability of reservoir data, which is often limited in the early stages of any geothermal development Hence the use of stochastic methodologies for geothermal reserve estimation In this paper, we develop a mathematical model based on a volumetric approach to estimate energy reserves of the eastern region of Morocco

15. LA TELEDETECTION AU SERVICE DE LA CARTOGRAPHIE GEOLOGIQUE : CAS DE LA BOUTONNIERE KERDOUS

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Mapping is currently undergoing significant development, with a shift from classical processing based on data collected from land and aerial photos to a more advanced approach that uses images optimized through digital processing Optical imagery analysis and exploitation, particularly using digital spectral data from satellites such as Landsat 8 OLI and Sentinel, are significant contributions to geological mapping The Kerdous inlier is an exceptional geological object to carry out a cartographic study in a segment of the little studied Pan African chain Additionally, it provides an opportunity to test the validity of satellite radiometric treatments in the field of numerical geological cartography The results of the treatments include semi automatically generated lithological classifications aimed at producing more detailed maps

16. Comparison of Machine Learning Methods for Landslide Susceptibility Mapping in Morocco s Mountainous Rif Region

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Mapping landslide susceptibility has become increasingly urgent and crucial for ensuring safety and protection This study compared four machine learning methods for landslide susceptibility mapping in the Taounate province, Morocco Using a database of 255 landslides and fifteen conditioning factors, the four models generated maps with high accuracy (AUC values above 0 954), with the CART model performing the best (0 971) However, the SVM model achieved the best performance based on five statistical parameters, making it ideal for landslide susceptibility mapping in other areas The study also revealed that precipitation, slope, distance to the river, and distance to faults were the most significant factors contributing to landslides in the study area These findings provide valuable information for government agencies and policy makers to make informed decisions for future landslide hazard prevention

17. Assessing the Reliability of Satellite Climate Data as an Alternative to Gauge Measurements for Water Resources Management in Meknes Plateau

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Access to reliable weather data is crucial for water resource management We investigated the use of satellite climate data instead of weather station measurements on the Meknes plateau Using high resolution TerraClimate monthly data and the Python GEEMAP library, we evaluated satellite provided measurements of precipitation, temperature, evapotranspiration, and runoff Our results showed high correlation for precipitation, temperature, and potential evapotranspiration (r=0 98 0 99), moderate correlation for actual evapotranspiration (r=0 83) with a positive bias (5 93) and larger errors, and good correlation for runoff (r=0 89) with a negative bias (4 23) and small errors Our approach provides reliable estimates for P, T, ET potential, and R for water balance calculations and decision making

18. Modelisation 3d des grottes cas de la grotte Aziza Province Errachidia

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From the middle of the 19th century, speleological topography became a discipline, if not an art, which supported the work of both explorers and scientists Under exploitation is explained by the lack of evaluation of the richness of Morocco's karst and cave heritage, the topographic maps of Moroccan Caves are poorly carried out or absent, the last inventory of Moroccan Caves dates from 1981 The objective of this study is to represent the AZIZA Cave virtually, appreciate its volume, and optimize the topography of the latter based on 3D technologies Two methods were used, the topography of the cave by a DISTO X, and the results of the 3D projection of the cave were carried out on the software VISUAL TOPO Secondly, we carried out 3D modeling by lasergrammetry using a TLS FARO FOCUS 70, to scan the main entrance, the main axes, and the large rooms of the AZIZA

19. Modeling of groundwater levels by coupling remote sensing and artificial intelligence

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This study aims to develop an innovative approach combining space based remote sensing, in situ measurements and artificial intelligence to predict the evolution of groundwater quantity up to several months in advance Spatial data from earth observation satellites allow to obtain near real time data and to use in predictive model's other variables such as vegetation indices and land use In this study, we focus on the challenges related to the use of remote sensing data as input for artificial intelligence models, in particular: How do remote sensing product resolutions influence themodel s outcome? what is the contribution of Multi scale NDVI extraction to groundwater level forecasting using AI models? How does the extraction of NDVI images as a predictive variable contribute to GWL predictions using AI models? What is the impact of land use in GWL forecasting using IA?

20. Application des methodes; geophysique, teledetection et SIG en prospection des ressources en eau en milieu fracture; Cas de l'Anti Atlas Occidental, Maroc

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La rarete de l eau est l obstacle majeur au developpement durable dans les regions

sous climat aride et semi aride La recherche de methodes fiables et moins couteuses pour detecter les zonespotentielles en eau est d une importance primordiale Ce travail serta developper et validerun modele numerique de l indice de potentialite des eaux souterraines GPI (Groundwater Potentiality Index) et pour cartographier les zones propices a la mise en place de futurs forages d'eau

21. etude geologique sur la zone de berchid

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Architecture du bassin moi pliocene de Berchid Essai de modelisation hydrogeologique Ikram KHADIR,Mohamed SAADI et Naima el ASSAOUI Laboratoire LG2E, Departement de Geologie, Faculte de Sciences, Universite Mohamed V in Rabat Le Plio Quaternaire est transgressif sur la serie sous jacente, il debute par des conglomerats et des niveaux lumachelliques recouverts par des calcarenites et des sables dunaires Le quaternaire montre des facies diversifies sous forme de limons noirs, des argiles limoneux rouges et des tufs calcaires La sedimentation plio quaternaire associee a cette periode est fortement liee a une tectonique distensive mio pliocene responsable a la fois de la creation d espace disponible et de la bonne preservation des sequences de depots favorables pour une correlation haute frequence L'objectifde notre recherche sera basee sur des etudes geologiques et hydrogeologiques couplant l'observation sur terrain et l'analyse des forages pour un but de modelisation hydroge

22. etude de zone de berchid

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etude geo physique et geo chimie sur la zone de berchid, etude geologique sur le subsurface de la zone de berchid

23. Foraminiferes du Cretace dans le Rif marocain : Outil pour comprendre l evolution des paleoenvironnements, promouvoir la durabilite et gerer les ressources geologiques

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Cette communication orale mettra en lumiere l etude des foraminiferes planctoniques du Cretace dans les bassins sedimentaires du Rif marocain Leur importance en tant qu outil pour comprendre l evolution des paleoenvironnements et dater les structures geologiques sera abordee, ainsi que leur utilisation dans la reconstruction des paleoenvironnements marins et leur contribution dans l exploration des ressources naturelles Les resultats recents et leur implication potentielle dans la promotion de la durabilite et la gestion des ressources geologiques seront discutes En conclusion, cette communication mettra en evidence comment l etude des foraminiferes du Cretace dans le Rif marocain est essentielle pour comprendre l evolution des paleoenvironnements, dater les structures geologiques et contribuer a la durabilite et a la gestion des ressources geologiques dans cette region

24. Impact of data imputation on the assessment of climate trends (case study of precipitation in the Souss Massa watershed

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In the context of this work, prior to gap filling, we conducted an analysis of outliers in the initial database using the Z score technique Then, we evaluated the performance of three gap filling techniques, namely KNN, MICE, and missForest The imputed dataset was used to study the impact of gap filling on trend analysis and detection of significant changes that occurred in the past in pre-

cipitation time series These breakpoints were calculated using three statistical tests (Pettitt, Buishand, and Standard Normal Homogeneity Test SNH), while potential trends in the climate data were investigated using the Sen and Mann Kendall statistical tests Robustness tests were conducted to determine from which point the imputation of data had an impact on trend calculation and series breakpoints

25. MODELISATION ET CARTOGRAPHIE DU RISQUE DE L'EROSION HYDRIQUE PAR L'APPLICATION DES SIG ET DES DIRECTIVES PAP/CAR CAS DU BASSIN VERSANT

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La modelisation de l erosion hydrique dans le bassin versant de MAZER a ete realisee en utilisant la methode PAP/CAR Cette methode est basee sur l analyse de differents parametres tels que la topographie, les caracteristiques du sol, les pratiques agricoles, le climat, la vegetation et la densite de population Les resultats de cette etude ont montre que le bassin versant de MAZER presente une sensibilite elevee a l erosion hydrique, en particulier dans les zones de pente elevee et de faible couverture vegetale Ces resultats ont permis d identifier les zones les plus vulnerables a l erosion et d etablir des recommandations pour une gestion plus durable des sols et des ressources naturelles dans la region

26. Caracterisation physico chimique des gisements argileux au Maroc

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Le H A O et la meseta marocaine sont caracterises par une tectonique distensive qui a favorise a la formation des bassins sedimentaires triasiques connus par des depots detritiques et des formations volcaniques qui sont formes suivant une orientation NE SW a NNE SSW liee a l'ouverture de l'Atlantique Central liee avec l'apport de sediments et la transgression de la mer tethysienne La formation et l'evolution des gisements argileux au niveau de ces bassins s'est formee apres la transgression tethysienne et sous des conditions climatique chaudes et arides ce qui entraine a la formation des evaporites, la sedimentation de ces depots argileux et avec l'apparition des formations volcanique intermittente avec les sediments detritiques L'apport sedimentaire et son succession dans les series etudiees sont differents, chose qui nous permet de faire etudier et analyser a travers une comparaison entre deux zones sedimentaires ; region de Maaziz et region d'Imin'tanout

27. Contribution of Physico Chemical Parameters of Groundwater to the Improvement of the Knowledge of Aquifers of the Cretaceous Basin of Errachidia Boudenib (Morocco)

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The Cretaceous basin of Errachidia Boudnib, this part which is the subject of our study of water wells and boreholes has for objective the evaluation of its physico chemical characteristics in the South East of the Kingdom of Morocco in the pre Saharan South Atlasic zone L'approche methodologique basee sur le prelevement et l'analyse de 20 echantillons d'eau de forages et des puits the pH of the aquifer waters is slightly neutral with an average pH 6 9 0 6 It is highly mineralized with an average electrical conductivity of 4 7; 3 7mS/cm A strong correlation is reported between TDS and major ions (Ca, Mg, Cl and K) Three facies characterize the analyzed waters, with a dominance of the chloride and sulphate calcic and magnesian facies followed by the sulphate Sodic facies and the chloride sodic facies which is represented by the salty waters brought by the infracenomanian aquifers of the Cretaceous basin

28. Caracteriser la capacites des eaux souterraines a se recharger artificiellement une etude de cas du bassin du ziz, au sud est du Maroc

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Le succes de la recharge artificielle des nappes phreatiques repose essentiellement sur le bon choix du site pour realiser l operation La methodologie developpee dans le cadre de mes recherches consiste a caracteriser la capacite des nappes phreatiques a se recharger artificiellement, en vue d identifier les secteurs les plus favorables a ce fonctionnement ; le developpement de cette nouvelle methodologie repose sur deux etapes ; la premiere est theorique et consiste a identifier les parametres les plus pertinents pour la recharge naturelle et artificielle des eaux souterraines et a leur attribuer un poids representatif ; la deuxieme etape concerne l application de la methodologie sur les aquiferes souterrains du bassin du Ziz

29. L'Information Spatial, Une Realite Devouee a l'Amelioration De la Cartographie Geologique

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La possibilite offerte par la teledetection spatiale d'observer de facon continue la surface de la Terre, permet de decrire la nature des unites litho stratigraphiques en utilisant les caracteristiques de couleur (d'alteration et d'erosion), l'epaisseur du substratum rocheux et de les delimitees graces a leurs signatures multispectrales et leurs morphologies de surfaces, dont l'exploitation fournit une vue generale requise pour dresser des cartes d'unites regionales utiles aux analyses a petite echelle et a la planification des verifications des unites de terrains en vue d'une cartographie detaillee, comprendre la distribution spatiale et la relation de surface entre les unites a ce titre les images sentinelles 2A constituent de veritables outils a fort potentiel evalue sur l'exemple de la Boutonniere Bou Azzer el Graara, ou une methode de determination de contours geologiques peut etre mise au point, a partir d'une combinaison de donnees multispectrales des images satellitaires

30. Zonation des masses d'eaux souterraines en Corse (France) a partir des caracteristiques bacteriologiques et physicochimiques

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Le travail conduit sur 2830 echantillons d'eau couvrant le territoire de la Corse sur lesquels ont ete mesures les teneurs des parametres physicochimiques et bacteriologiques Une methodologie multi parametres de regroupement des Masses d'Eaux Souterraines (MESO) est proposee et consiste a rechercher une transformation des donnees permettant de s'approcher d'une distribution normale,puis d'effectuer une reduction dimensionnelle grace a une Analyse en Composantes Principales (ACP) dont les premiers axes factoriels sont conserves afin d'eliminer le bruit statistique L'etape suivante permet de calculer les caracteristiques moyennes de chaque axe factoriel pour chacune des MESO,ce qui permet de classer les MESO par degre de ressemblance tous parametres confondus Le resultat obtenu est tres coherent avec la geologie structurale de la Corse Les ensembles obtenus regroupent alors les territoires relativement homogenes en termes de processus responsables de la qualite des eaux

31. Application de la technologie geo spatiale a la correction des cartes geologique du Jbel Saghro (Anti Atlas Orientale Maroc)

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L'objectif de cette etude est de faire la mise a jour des cartes geologique qui ont ete fait dans le massif de Jbel Saghro Le socle Neoproterozoique du Jbel Saghro est compose des sequences meta sedimentaire du groupe de Saghro d'age Cryogenien, introduits par des granitoidesd'age Cryogenien tardif Ces roches sont recouvertes en discordance par une puissance serie volcanique et volcans clastiques d'age Ediacaran Toutes ces unites sont coupees par des reseaux de failles associees a des flux de fluides hydrothermaux Pour resoudre ce probleme, nous avons developpe une approche methodologique basee sur les images Sentinelle 2, Landsat 8 et Landsat 9 Pour les caracteristiques multi spectrales des formations geologiques Plusieurs techniques ont ete appliquees sur l'image sentinelle 2A, sentinelle 2B et Landsat 9 Ces techniques incluent la correction radiometrique, le Flash atmospherique, la composition coloree, les bandes rationnelles et l'analyse en composante principale

32. cartographie multi parametres de la qualite des eaux souterraines de la region AUVERGNE RHONE ALPE

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La cartographie regionale de la qualite des eaux souterraines peut conduire a de nombreuses difficultes du fait de la multiplicite des criteres facilement mesurables et de la redondance de plusieurs de ces parametres L'etude porte sur 8078 analyses d'eau sur 11 parametres physico chimiques et 2 parametres bacteriologiques Dans un premier temps, a l'aide d'outils statistiques univaries classiques l'etude de la distribution des frequences a montre qu'il est preferable d'utiliser la transformee logarithmique des donnees L'etude de la structure spatiale de l'information a partir de variogrammes directionnels a montre une typologie de parametres classant les elements majeurs ensembles structures selon la lithologie regionale, les criteres bacteriologiques presentant une forte variabilite spatiale acourte distance, Fer et nitrates se situant entre la bacteriologie et les elements majeurs Cette typologie se traduit dans la cartographie des differents parametres s

33. Evaluation spatiale de l'erosion des sols agricoles par le modele RUSLE dans le bassin versant de Mazer plateau de Settat Maroc

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Les pertes de sol par erosion hydrique est un probleme qui contribue a la degradation des terres dans de nombreux pays, y compris le Maroc La presente etude a pour but d'evaluer le risque d'erosion des sols dans le bassin versant Mazer qui est situe dans une region agricole de la province de Settat au Maroc En utilisant l equation universelle de la perte en sols revisee (RUSLE) en incorporant les divers elements causaux de l equation dans un Systeme d Information Geographique (SIG) et de la teledetection L'erosivite des pluies "R", l erodibilite des sols "K", le couvert vegetal "C", la topographie "LS" et les pratiques antierosives "P" En superposant ces cinq facteurs, une carte quantitative des pertes de sol a ete elaboree pour le bassin versant Les resultats obtenus revelent que la degradation specifique presente une moyenne d environ 77,2 (T/ha/an), avec des variations allant de 0,6 T/ha/an a 885,2 T/ha/an

34. Assessing the Spatial Scale of Groundwater Quality in the PACA Region of France: Combining Clustering approaches with Machine Learning Methods

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Optimizing groundwater quality monitoring and management is crucial for ensuring safe water for human consumption This study focuses on the Provence Alpes

Cote d Azur region in France and proposes a relevant spatial scale for studying groundwater quality A dataset containing physico chemical and bacteriological analyses of water, as well as groundwater body boundaries, was used to group 63 groundwater bodies into 11 homogeneous clusters using logarithmic transformation, and hierarchical clustering Machine learning methods were used to predict groundwater body groups based on chemical and microbiological composition Results show that machine learning methods can be used to assess and manage groundwater quality The study highlights the need to consider temporal variability when implementing monitoring and management programs

35. Cartographie du potentiel en eau souterraine des aquiferes fractures a l aide de la teledetection et des technologies SIG dans la region de Fritissa Tissaf du bassin du Moyen Moulouya, Maroc

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La rarete de l eau est un obstacle au developpement dans les regions sous climat semi aride La recherche de moyens fiables d'identifier les ressources en eau s'avere primordiale Dans cette etude, une approche de teledetection avec SIG est adoptee par un algorithme de ponderation des parametres dynamiques (APPD) pour developper un modele numerique de l indice de potentiel des eaux souterraines GPI et cartographier les zones potentielles dans la zone d'etude ; basee sur l analyse des conditions, liees a la fracturation, la lithologie, le drainage, la topographie, la pluviometrie et les donnees hydrogeologiques de 179 forages Les resultats preliminaires temoignent de l'applicabilite de l'approche proposee ce qui est montre par la comparaison des differents facteurs aux debits d eau observes, un coefficient de correlation significatif a ete trouve Les presents resultats confirment l existence d aquiferes et encouragent l adoption d une approche basee sur le GPI dans d autres regions

36. l intelligence artificielle pour la cartographie geologique a l aide des donnees de teledetection

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La cartographie geologique est une preoccupation cruciale pour la comprehension de l histoire geologique, l'exploration des ressources minerales et l evaluation de nombreux risques environnementaux, Cependant, cette tache peut etre tres difficile si elle est realisee manuellement, en particulier dans des zones eloignees necessitant une grande quantite de travail et de ressources humaines Recemment les progres technologiques de teledetection ont permis de collecter des donnees plus rapidement et a moindre cout En utilisant l'IA et des donnees de teledetection, il est possible de creer une approche rapide, precise et peu couteuse pour la cartographie geologique Cette etude a utilise l apprentissage profond via les reseaux neuronaux convolutifs pour la cartographie geologique d une zone situee au sud du Maroc (Anti Atlas) Les resultats preliminaires montrent que les CNN utilisent efficacement les donnees de teledetection pour generer une carte lithologique precise de la zone d etude

37. Action erosive et temoins de recul de la ligne de rivage dans le secteur de Rabat Sale : impact sur l amenagement cotier

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Dans la zone cotiere de Rabat Sale, l exploration de terrain, l analyse des archives cartographiques et photographiques, ainsi que la comparaison des images satellitaires nous apportent un fort temoignage sur la dynamique littorale et le recul de la ligne de rivage Cette

contribution se propose de montrer des exemples de sites endommages par l erosion cotiere notamment ceux qui abritent des monuments historiques d une grande importance Un essai de suivi de l evolution quantifiee du trait de cote a travers le temps est aborde Si le role des facteurs naturels notamment geologique et climato eustatique semble evidemment clair dans l evolution du littoral, l activite anthropique est a bien prendre egalement en consideration

38. IMPORTANCE DE LA CARTOGRAPHIE DETAILLEE AU (1/1000eme) DANS LA MISE EN EVIDENCE D'UNE TECTONIQUE SYNSEDIMENTARE EN REGIME EXTENSIF A TRANSTENSIF DANS LES SERIES DU PASSAGE DEVONIEN TERMINAL - VISEEN SUPERIEUR (Nord de la Bande de Benslimane, Meseta NW, Maroc)

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La cartographie detaillee au(1/1000eme) du secteur septentrional de la bande de Benslimane a permis de reveler une importante tectonique synsedimentaire affectant les series detritiques, du passage devonien terminal carbonifere L'evolution temporelle de la tectonique synsedimentaire montre la dominance d'episodes extensifs a la base de la serie (Tournaisien p p) et la tendance a un regime transtensif L'analyse structurale revele deux episodes:i) Episode d'ouverture extensive (3 : N155 a N169), ii) Episode de regime a contraintes1: N15 a N45 L'ensemble des donnees, indique l'individualisation d'un ;'Bassin de Skhirate" en extension au Tournaisien p p puis trenstensif au Viseen L'analyse geostatistique indique une augmentation graduelle du facteur de concentration des contraintes K: de 1,7 a 3,17 au sommet de la serie Ce qui est confirme par les valeurs de deviateur des contraintes qui diminuent de moitie dans ce sens

39. Identifying Favorable Zones for Mineral Exploration in the Saghro Massif Using GIS and Geoscience Datasets

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The Moroccan Anti Atlas belt is well known for its mineral potential, and the Saghro massif is considered to be one of the largest potential zones in this region In order to identify new targets for mineral exploration in this area, a combination of several geological layers was used in conjunction with fuzzy overlay logic In this study, the geoscience datasets used included Neoproterozoic acid volcanic and intrusive rocks, hydrothermal alterations, faults, structural complexity zones, and geochemical anomalies The results showed that the Neoproterozoic Cambrian boundary was a highly favorable target for undiscovered mineral deposits with high mining potential Eight favorable zones have been identified, suggesting the existence of Cu Ag Pb and Ag Hg mineralizations types associated with the late Neoproterozoic acid volcanic rocks of the Ouarzazate group This approach can be used to prioritize mineral exploration efforts and focus on areas that have the highest potential mining

40. ETUDE MORPHO SEDIMENTAIRE ET PALEO ENVIRONNEMENTALE DES FORMATIONS HOLOCENES DE LA MARGE NORD OUEST SAHARIENNE PLAINE DE DRAA, MAROC

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Les terrasses alluviales Holocenes sont des archives geologiques importantes qui fournissent des informations precieuses sur l histoire environnementale et climatique Elles presentent des enregistrements interessants

pour reconstituer l evolution environnementale de l Holocene Dans le cadre d'un projet Toubkal entre l'Universite Mohammed V et l'Universite Lyon 2 Une serie de coupes Holocenes ont ete relevees et echantillonnees sur la rive gauche de l'oued Draa Une etude pluridisciplinaire comprenant la geomorphologie, la sedimentologie, la geochimie et la radiochronologie a ete menee pour ameliorer les interpretations paleo environnementales et determiner une chronologie precise des formations alluviales Holocene La jonction de l etude morpho sedimentaire sur le terrain avec l analyse multi proxy en laboratoire, ainsi que la datation radiocarbone au C14, permet de reconstituer l hydrodynamisme de l oued Draa et l evolution sedimentaire des formations de Draa

41. A STUDY OF HOLOCENE CONTINENTAL FLUVIAL DEPOSITS IN THE MIDDLE MOULOUYA BASIN (MOROCCO) AIT ICHOU: FIRST MALACOLOGICAL, LITHOBIOSTRATIGRAPHIC AND PALEOENVIRONMENTAL DATA

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This study deals with the litho biostratigraphic analysis of the Holocene fluvial deposits of the Middle Moulouya valley, west of Midelt region, with a view to a chrono stratigraphic and paleoenvironmental reconstruction of the Early Holocene period through the associated malacological assemblages The malacological study is based on the description and detailed statistical processing of the species collected In this Early fine floodplain Holocene sequence of 1 5m depth, 19 species were collected and studied It presents two hydromorphic paleosols associated with archaeological material The first is dated (11176calBP 11689calBP) where the malacological communities develop and diversify rapidly the upper level dated 10242calBP 10495cal BP, indicating a change in environmental conditions with an increase in dry periods To explain these environmental changes, the hydrogeomorphological, climatic and/or environnemental forcings have to be discussed

42. L integration de la teledetection dans la cartographie geologique de la boutonniere d Agadir Melloul

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La boutonniere d'Agadir Melloul est parmi les zones les plus importantes du domaine Anti Atlasique Des formations en temoignent par l'affleurement d'un socle d'age Paleoproterozoique La cartographie geologique de cette boutonniere est soumise a de nombreuses contraintes et difficultes ce qui met la fiabilite des cartes geologiques de cette zone en point de discussion y compris les dernieres cartes publiees dans le cadre du plan national de la cartographie geologique (PNCG) Dans cette etude nous avons developpe des methodes et techniques geospatiales soutenue par la proposition des solutions pratiques pour ameliorer la resolution et la precision de ces cartes geologiques Parmi les approches proposees, il y a celles de la teledetection et l'analyse geospatiale qui nous en aider a approfondir nos analyses et bien circonscrire les formations geologiques pour rectifier et corriger les erreurs des cartes multi echelles

43. Evaluation of the paleogeography, and characterization of the lead zinc mineralization High plateaus Morocco

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The high plateaus, which are deformed by the Hercynian and Alpine orogeny, are responsible for the division into Horst and Graben These lands represent a paleo foreland, structured by a Paleozoic basement, generally Visean, Namurian and Westphalian, covered by Triassic lands, and the

whole is overlain by Jurassic carbonate deposits These Jurassic terrains, especially the Aleno Bajocian, host important lead zinc mineralization We have adopted three approaches to achieve our work, i) bibliographic synthesis; ii) field work iii) descriptive and synthetic study of two core holes The dolomitization This preliminary study is the subject of further work, including detailed geological mapping; systematic sampling of the mineralized structure; identification of the origin of the hydrothermal fluid, as well as the cause of metal precipitation; and proposal of a genetic model

44. Contribution des resultats des reconnaissances geologiques des sites de barrage Ribat Al khayr region de Sefrou a la perfection de la cartographie geologique

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Ce travail expose la synthese des resultats des travaux de terrain effectues dans le barrage Ribat Al Khayr qui se situe dans la province de Sefrou sur oued Zloul a environ 9 Km a l'Est du village Ribat Al Khayr La methodologie utilisee pour la cartographie de site du barrage Ribat Al Khayr a ete fondee surles parametres topographiques du bassin ont ete effectues pour determiner les contours des bassins versants et des pentes Une etude geologique a ete realisee pour determiner la nature et les caracteristiques des roches et du sol, Enfin, des essais de compression sur carottes Notre objectif dans ce travail est de contribuer a la precision de la cartographie geologique de barrage Ribat Al Khayr Pour ce faire,effectue une etude geologiquesur le site potentiel de barrage egalement analyser les roches de site afin de determiner leur potentiel de stabilite et de resistance a la rupture evaluer le risque geologique de site etproposer des solutions pour minimiser ce risque

Thematic 25

Statistics and Applications

1. Optimisation multiobjectif pour le deploiment des lecteurs RFID

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The RFID system consists of an electronic tag attached to an object, readers, and a middleware In the latest real applications based on the RFID technology, the deployment of readers has become a central issue for RFID network planning by means of optimizing several objectives such as the coverage of tags, the number of readers, and the readers/tags interferences In practice, the system is affected by uncertainty and uncontrollable environmental parameters Therefore, the optimal solutions to the RFID network planning problem can be significantly reduced with uncontrollable variations in some parameters, such as the reader s transmitted power In this work, we propose a robust multi objective optimization approach to solve the deployment of RFID readers In this way, we achieve robust optimal solutions that are insensitive to uncertainties in the optimization parameters

2. The impact of capital goods prices on Africa's economic performance

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Over the last four decades, the relative price of investment goods in Africa has gone through a relatively large decrease, resulting in a steady convergence towards the levels recorded in high income countries This fact begs the following question: To what extent might the relative price decrease be a driving force behind the economic performance of this continent? The paper addresses this question from the perspective of a panel ARDL approach, using the Solow growth model-;augmented with barriers to investment-;as a framework The results reveal that a one unit decrease in the relative price of investment leads, in the long term, to a 4% increase in per capita GDP, an increase that could be neutralised by a 6 5 percentage points decrease in the savings rate The findings contribute to the case for a policy mix that combines policies geared towards reducing investment distortions with those promoting savings mobilisation

3. Simple Convergent Procedure To Estimate An Exploratory Factor Analysis Model

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Exploratory Factor Analysis is a prevailing statistical reduction technique for explaining the covariance structure of high dimensional data using a small number of factors The main step in the whole modeling process is parameter estimation The method used for this purpose is the BFGS procedure In practice, BFGS does not present any problem of

convergence However, to date, no proof of its convergence is available The present paper introduces an alternative estimation strategy based on the Least Square criterion and establishes its convergence properties An illustrative example of this proposed strategy is presented Furthermore, theoretical and numerical comparisons between the classical estimation method and the proposed procedure are discussed and illustrated

4. a comparative study of geometric and exponential laws in modelling the distribution of daily precipitation durations

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The goal of this study is to model and analyze the wet and dry duration distributions For this intent, daily rainfall data for Kenitra station were used on the period from 1967 to 2017 To represent the distribution of wet and dry durations, First order Markov chain, Second order Markov chain, and truncated negative binomial distribution are applied to represent the distribution of wet and dry durations To assess the data adherence to the proposed models, the Chi square and Kolmogorov Smirnov tests have been used The Akaike information criterion is applied to determine the most effective model distribution We go further to investigate the distribution of the number of wet and dry days over a k day period This law is implemented using an algorithm based on conditional laws This work is completed by comparing the calculated moments of the three estimated models to the observed moments of the number of wet/dry days over k consecutive days

5. Comparing Machine Learning Methods SVR, XGBoost, LSTM, and MLP in Forecasting the Moroccan Stock Market

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This research investigates modeling and forecasting the daily prices of the Morocco Stock Index 20 (MSI 20) using various Machine Learning (ML) methods: Support Vector Regression (SVR), eXtreme Gradient Boosting (XGBoost), Multilayer Perceptron (MLP), and Long Short Term Memory (LSTM) models Results show that, when applying the Grid Search (GR) optimization algorithm, the SVR and MLP models outperform others with high accuracy in forecasting daily prices This research contributes to financial research for academics and business practitioners by predicting the direction of stock prices

6. Overcoming convergence problems in PLS path modelling

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Hanafi (2007) points out that there are two procedures for calculating the latent variable scores : the original procedure as proposed by Wold, and extended by Hanafi (2007) called the Hanafi Wold procedure (2020), and an alternative procedure introduced by Lohmoller called the Lohmoller procedure The systematic use of the Lohmoller procedure fo computing the latent variable scores can be ineffective The contribution of this article is to remedy the issue of non convergence of the Lohmoller procedure Consequently, a new procedure for computing the latent variable scores, called Signless Laplacian Matrix (SLM) will be introduced, the main difference between the two procedures (SLM and Lohmoller) lies in the use of two different matrices to perform their iterations, both monotony and error convergence for this new procedure will be established

7. SUR LA BI STABILISATION BI EXTReMALE

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La programmation lineaire a ete developpee comme la theorie des jeux Elle permet de resoudre des problemes de maximisation ou de minimisation, en visant soit a maximiser les gains, soit a minimiser les couts, soit les deux De plus, les algorithmes de la theorie des jeux ont un impact important sur les plus grandes entreprises comme la NASA qui a utilise la theorie des jeux cooperatifs avec utilitaires transferables dans ses bibliotheques PVS (Voir [1]) Ceci conduit M EL KAMLI et A OULD KHAL a introduire l'algorithme de stabilisation extremal qui converge rapidement en comparant avec simplexe (Voir [2])

Ce travail est une extention de la publication de M El kamli et A Ould khal En effet, nous allons definir plusieurs notions de la theorie des jeux cooperatifs sur l'espace produit 1 2 Ensuite on va introduire l'algorithme de bi stabilisation bi extremal qu'on peut l'utiliser pour resoudre des problemes de maximisation dans l'espace produit 1 2

Index of Authors

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