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INTRODUCTION

We had the great honor of organizing 3rd International Conference on Recent Academic Studies ICRAS 2024. It was truly a great pleasure for us to greet a lot of participants from many different countries attending ICRAS 2024! We firmly believe that the conference will become an important international event in the field of cross-industry discussion about innovations in Academic Studies.

Three cooperating organizations supported the two-day conference. There were 483 papers accepted for presentation at ICRAS 2024, contributed from different countries. We had plenary speeches and several well-known scientists and experts, to give invited talks at differentsessions.

The purpose of ICRAS 2024 was to provide a forum for the participants to report and review innovative ideas, with up-to-date progress and developments, and discuss novel approaches to the application in the field of their own research areas and discuss challenges of doing science.

We sincerely hope that the exchange of ideas on doing research, science and improving education will help the participants, and international cooperation sharing the common interest will be enhanced.

On behalf the Organization Committee of ICRAS 2024, we would like to heartily thank our cooperating organizations for all they have done for the conference. We would also like to thank the authors for their contribution to the proceedings; the participants and friends of ICRAS 2024, for their interest and efforts in helping us to make the conference possible; and the Editorial boards for their effective work and valuable advice, especially the ICRAS 2024 secretariat and the ICRAS 2024 staff, for their tireless efforts and outstanding services in preparing the conference and publishing the Proceedings.

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126	Improving Water Quality Prediction with Artificial Bee Colony Algorithms and Support Vector Machines	Samira Tareda, Achouak Madania, Faiza Omaria	Algeria, Algeria, Algeria	Submission 904
127	Sub-chronic effects of a xenobiotic on the mortality and behavior of the terrestrial gastropod Cornu aspersum	Bendjebbar Roumaissa, Berrouk Houda, Ramdini Ramdane	Algeria, Algeria, Algeria	Submission 906
128	Doped Zinc Orthosilicate Nanophosphors with Improved Electrical Characteristics	Muhammad Sadiq, Muhammad Zubair Farrukh, Azhar Hussain, Muddassir Ali	Pakistan, USA, Pakistan, Pakistan	Submission 907

129	Assessing the effects of calcined red mud on the physical and mechanical properties of mortar	Chenchouna Hadjer, Boucherit Dalila, Hachemi Samia	Algeria, Algeria, Algeria	Submission 910
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Türkiye dışından toplam 19 farklı ülkeden (Fas, Cezayir, Malezya, Filistin, Hindistan, Suudi Arabistan, Nijerya, Irak, Macaristan, Pakistan, Arnavutluk, ABD, Makedonya, Tunus, Ukrayna, Fransa, Azerbaycan, Hırvatistan, Slovakya) katılım sağlanmış olup, 483 adet bildirinin 266 (%55,07) tanesi yabancı katılımcı tarafından sunulmuştur.

Kongremize ilginiz için teşekkür ederiz.

Saygılarımızla,



11.12.2024

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İlgi : Öğretim Üyesi Doç. Dr. Nermin KİŞİ'nin 30.10.2023 tarihli dilekçesi.

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Synthesis and characterization of double lamellar hydroxide MgAl CO_3 LDHs calcined et non calcined : FTIR

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Abstract **-** Unquestionably, one of the most concerning aspects of the global environmental crisis is wastewater pollution, which is currently of particular interest internationally. The double lamellar hydroxides (HDL), also known as anionic clays, are among the various porous adsorbents that have generally been studied. Because of their high anionic exchange capacity (2 to 5 mmol/g), large specific surface area (20 to 120 m2/g), presence of charges on this surface, and especially the exchangeability of interlamellar anions, these clays have attracted a lot of attention in recent years for a variety of applications. The present work aims firstly to synthesize Mg/Al ratio of 2 Mg-Al-CO3 by using co-precipitation method. The obtained material calcined et non calcined was characterized by infrared spectroscopy (FTIR), the spectra of MgAl-CO3 phases show absorption bands around 3413.The shoulders located at about 1354 assigned to the vibrational modes of carbonate anions.

After calcination, we observe a significant reduction of the intensities of the characteristic peaks of the carbonate anions around 1396cm-1, we also notice the reduction of the intensity of the peaks characterizing the existence of water molecules for all the calcined phases. These spectra are characteristic of mixed oxides of spinel type. After hydration, these oxides are reconstructed giving structures HDLs whose crystallinity is somewhat reduced.

Keywords – LDHs, ratio, adsorption, co-precipitation, characterized

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DEPRESSION IN MALE BALB/C MICE BEFORE AND AFTER CASTRATION (EVALUATED DURING THE TAIL SUSPENSION TEST)

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Abstract: Stress is the body's response to any demand placed on it, characterized by a chemical reaction in the brain that produces cortisol in response to a stressor. This hormone then activates other areas of the brain in reaction to the perceived threat, leading to various effects on our metabolism.

When stress is chronic, it can lead to the exhaustion of the body and the emergence of various pathologies, such as anxiety and depression disorders. Depression is a multifactorial condition associated with biological disruptions.

Our work aims to evaluate the degree of depression caused by chronic restraint stress in a model of castrated Balb/C mice. The level of depression is measured through a restraint test, with the duration of immobility interpreted as resignation or an expression of despair.

Our results indicate that before the application of chronic stress, there were no significant differences in depression levels among the males. After the chronic stress was applied, our findings show that castrated males were more depressed in response to stress. We hypothesize that the absence of gonads and thus specific reproductive hormones plays a role in influencing stress.

Keywords: Castrated Balb/C mice; restraint stress; depression; tail suspension test; reproductive hormones.

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Innovations and Challenges in Sustainable Construction Materials

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Abstract **–** This presentation explores the development and optimization of eco-friendly construction materials, focusing on geopolymer-based binders and composite mixtures incorporating cement, limestone, and calcined bentonite. The study investigates the impact of composition and temperature on compressive strength and durability. Initial results indicate significant enhancements in mechanical performance, making these materials viable for sustainable construction applications. Emphasis is placed on reducing the environmental footprint while maintaining high structural integrity.

Keywords – Geopolymers, sustainable construction, compressive strength, limestone, calcined bentonite, eco-friendly materials, mechanical performance, environmental impact.

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Artifact Reduction in Sparse CT Imaging Using Sinogram Data Completion

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Abstract - X-ray Computed Tomography (CT) is a cutting-edge imaging technique that provides detailed cross-sectional views of objects, making it invaluable in diverse fields. Conventional reconstruction methods, like filtered back-projection (FBP), require extensive projection data to deliver high-quality images. However, reducing the number of projections is critical to minimize the radiation dose, a necessary step to ensure patient safety or preserve delicate specimens. Unfortunately, fewer projections often result in image degradation and the emergence of artifacts.

This study focuses on developing an innovative reconstruction approach to address these limitations. The proposed method employs sinogram interpolation to compensate for missing projection data by generating additional projections from the incomplete sinogram. These interpolated projections are then processed using the FBP algorithm to reconstruct the final image. By bridging the gaps in data, this method ensures the reconstructed images maintain quality despite limited projections.

Experimental results reveal that this technique successfully reduces artifacts and enhances the visual clarity of CT images, even under sparse sampling conditions. This advancement offers a practical solution for achieving reliable imaging with lower radiation exposure, paving the way for safer and more efficient CT applications.

Keywords – Artifact Reduction, Sparse CT Imaging, Sinogram Data Completion

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Basic reproduction number and the sensitivity analysis of a model for the spread of COVID-19

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Abstract – In this study, we delve into the mathematical modeling of COVID-19 transmission dynamics by deriving and analyzing a compartmental model. We calculate the basic reproduction number to quantify the transmission potential of the disease and examine its dependence on crucial epidemiological parameters. Through sensitivity analysis, we identify the parameters that significantly influence these dynamics, providing valuable insights into effective control strategies.

Our findings can guide public health interventions and inform policies aimed at controlling the spread of COVID-19. By understanding which parameters most impact transmission, we can better target efforts to mitigate the pandemic's impact. This study highlights the importance of mathematical modeling in addressing public health challenges and underscores the need for a data-driven approach to managing infectious diseases.

By quantifying the transmission potential and exploring the key factors that influence it, we contribute to a deeper understanding of COVID-19's spread and offer strategies for its control. The insights gained from this study can help shape effective response measures and improve preparedness for future outbreaks.

Keywords –COVID-19 - Basic Reproduction Number - Sensitivity Analysis – Epidemic Model – Mathematical Modeling

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Nanotechnology in Chemical Engineering: Revolutionizing Materials and Manufacturing

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Abstract – Nanotechnology has emerged as a transformative force in chemical engineering, enabling breakthroughs in materials science, manufacturing processes, and industrial applications. This conference presentation explores the revolutionary potential of nanotechnology in chemical engineering, with a focus on how nanoscale materials and techniques are reshaping traditional methods of production. Advances in nanomaterials, such as nanoparticles, nanocomposites, and nanostructured surfaces, are leading to enhanced properties in materials, including increased strength, conductivity, and reactivity. These innovations enable more efficient and sustainable manufacturing processes, offering solutions to energy consumption, waste reduction, and environmental impact. The integration of nanotechnology with chemical engineering is also opening new frontiers in applications such as catalysis, drug delivery systems, sensors, and advanced coatings. The presentation will highlight key examples of nanotechnology in chemical engineering, its challenges, and the future potential of nanoscale technologies to revolutionize industrial practices and material design.

Keywords – Nanotechnology, Chemical Engineering, Nanomaterials, Nanocomposites, Manufacturing Processes, Sustainability, Catalysis, Advanced Coatings, Material Science, Nanostructures.

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Monitoring of Rotating Machines by the Vibration Analysis Method

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Abstract – Vibration monitoring can be an effective method of achieving results, and sometimes at lower costs. This last point, which represents the economic aspect of surveillance, is not negligible for an industrialist. The use of the vibrations involves a phase of analysis of the vibratory signal collected on the machine to be monitored.
In our experimental study at the level of the URMA laboratory, we made several tests, namely, without and with defects in the bearings and with a bearing geometric defect at different rotational speeds.
The results obtained will allow us to develop a database of the different defects. This will accompany to recognize the exact type of defect and consequently the cause of this damage.

Keywords –Vibration signal, Bearing fault diagnosis, bearing faults

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Theoretical and Experimental Study on the Conformational Behavior of a New Synthesized Organic Compound

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Abstract – This study explores the conformational properties of a newly synthesized organic compound through a combination of theoretical and experimental approaches. Computational techniques, including density functional theory (DFT), were employed to determine the compound's stable conformations, energy profiles, and structural parameters. Experimental validation was performed using advanced spectroscopic methods such as NMR and IR spectroscopy, providing insights into the molecule's geometry and conformational preferences. Theoretical calculations were further complemented by molecular docking studies to investigate potential interactions with biological targets. The results reveal a good correlation between theoretical predictions and experimental observations, offering a comprehensive understanding of the compound's conformational behavior and its potential applications in fields such as drug discovery and materials science.

Keywords – Crystallography, X-ray diffraction, Single crystal X-ray diffraction, DFT, Computational Chemistry, Theoretical Chemistry

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Assessment of radiation shielding properties in borosilicate glasses doped with Er_2O_3

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Abstract **–** This study systematically evaluated the gamma-ray shielding abilities of borosilicate glass samples with the chemical formula $70B_2O_3–5SiO_2–10Li_2O–5Bi_2O_3–10ZnO–XEr_2O_3$ and X = 0.0 (Er-0.0) to 1.2 (Er-1.2) mol% (abbreviated as BSLBZE). Using the EGS4 calculation code, shielding properties were determined for a total of 20 energies from 0.05 MeV to 2 MeV and then compared with data generated by XCOM. An increase in glass density from 2.95 g/cm³ to 3.12 g/cm³ was observed when the Er_2O_3 concentration was increased. A number of important radiation shielding parameters, such as gamma-ray kerma coefficients (kγ), radiation shielding efficiency (RPE), mean free path (MFP), fast neutron macroscopic cross section ΣR (cm^{-1}) and half-value layer (HVL), were determined. Samples with increased erbium doping have higher values for radiation protection efficiency (RPE), gamma-ray kerma coefficients (κ), and the fast neutron macroscopic cross-section ΣR (cm^{-1}), whereas the half-value layer (HVL) and mean free path (MFP) have lower values. The results demonstrate that increasing Er_2O_3 concentrations gradually improve the material's radiation shielding properties, with notable effectiveness in photon and neutron attenuation. This development significantly improves the glass matrix's overall shielding capabilities.

Keywords: Borosilicate glasses, Radiation protection efficiency, γ-kerma coefficient, EGS4

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Fracture Toughness, Hardness, and Impact Strength of Basalt Fiber-Reinforced Engineered Cementitious Composites

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Abstract – The Engineered Cementitious Composites (ECC) mortars are the most suitable alternatives for cement in the concrete industry in developing sustainable and environmentally friendly construction. Therefore, for the practical applications of fiber-reinforced (FRF) ECC mortars, it is essential to increase the mechanical and microstructural behavior of FRF-ECC mortars utilizing micro-fibers and nano-particles. The present study has struggled to ameliorate the fracture and impact behavior of micro basalt-FRF fly ash-based ECC mortars by adding different amounts of nano-Titania. Four different dosages of Titania (varying between 1% and 4%) of the mortar are used to manufacture ECC mortars comprising 2 wt.% of micro-basalt fibers (MBF). For a comparative assessment, a control model with 2% MBF having no dosage of Titania is also manufactured. The outcomes of the current study displayed that the use of 3% Titania in micro basalt-FRF-ECC mortar improved the hardness, impact strength, and fracture toughness by 17.1%, 54.3%, and 25%, respectively. Consequently, the usage of Titania is operative in the enhancement of the mechanical and fracture behavior of FRF-ECC mortar. These bands appear larger and more pronounced in specimens containing additive this could be due to the high content of water within ECC network, which could affect the strength.

Keywords – Engineered Cementitious Composites; micro-basalt fibers; nano-Titania; hardness, impact strength

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Quantum speed and geometrical phase in relation to quantum correlation under the effect of intrinsic noise

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Abstract – In this research, we examine how quantum speed, geometric phase and quantum correlation interact in the presence of intrinsic noise in a two-spin quantum system. Quantum technologies are limited by intrinsic noise, a key challenge for quantum computing, which disturbs the coherence and evolution of quantum states. Within the Heisenberg XXZ quantum model, we study two quantum speed measurements - the Bure speed and the Hilbert-Schmidt speed - to measure the influence of intrinsic noise on the evolution of quantum states. Our results show that the Bure speed is more resistant to intrinsic noise than the Hilbert-Schmidt speed, which follows a non-linear quantum correlation. This underlines the effectiveness of the Bure speed in capturing subtle, discrete changes in the quantum state, beyond linear measurements. In addition, we explore the relationship between geometric phase and quantum correlation, showing that enhanced quantum correlation can amplify geometric phase, leading to a better understanding of the dynamical properties of the system. Using geometric methods in projective Hilbert space, this research provides new insights into how intrinsic noise affects quantum dynamics and correlations. These results contribute to the development of robust quantum systems.

Keywords – quantum speed, quantum correlation, qeometric phase, projective Hilbert space, intrinsic noise, Heisenberg XXZ

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Theoritical investigation molecular dynamic study of a new organique compound

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Abstract – In this study, (Z)-2-hydroxy-N′-(4-oxo-1,3-thiazolidin-2-ylidene)benzohydrazide (HTBH) was theoretically studied. The B3LYP/6-311G (d, p) level of calculation was performed using the Gaussian 09 program to accomplish the optimal molecular geometry, the global reactivity descriptor parameters, Fukui functions, and molecular electrostatic potential (MEP) parameters. The reduced density gradient (RDG) was calculated with Multiwfn and VMD programs and was used to explore the non-covalent interactions in the molecular system. Furthermore, possible nonlinear optical characteristics were explored. These properties include the electric dipole moment, mean polarizability, and first and second hyperpolarizabilities, indicating the intriguing uses of HTBH in optical systems. The dipole moment of HTBH was calculated to be 6.81 D, while the static second-order hyperpolarizability was found to be of 29.86×10-36 esu. These parameters have larger values compared to the known nonlinear optical compounds, urea and pNA. The MEP map indicates that the title molecule is capable of undergoing a reaction, particularly through O atoms. Using molecular docking through AutoDockVina software, the inhibitory nature of HTBH against the methylene tetrahydrofolate reductase (MTHFR) protein was analyzed. This enzyme is involved in folate metabolism, and its inhibition can have implications for various biological processes. The docking results indicate that HTBH has a great deal of promise as an inhibitor of MTHFR due to its good binding affinity (-7.2 kcal/mol). Finally, through a detailed molecular dynamics (MD) simulation using the GROMACS 2021 program, we unravel the compound's inhibitory potential and binding characteristics, offering valuable information for developing therapeutic interventions.

Keywords – MTHFR, B3LYP/6-311G (d, p) level, Multiwfn, non-covalent interactions ,GROMACS 2021 program

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Structural and Spectroscopic Analysis, Fukui Function, Natural Bond Orbital (NBO) Study, and Biological Evaluation of a Novel Hydrazone Derivative

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Abstract – In this study, the molecular properties of 2-[(2,4-dimethoxybenzylidene)-hydrazono]-1,2-diphenylethanone (DBHDE) were investigated using both experimental and theoretical approaches. Experimental techniques, including IR, UV-Vis, and NMR spectroscopy, were complemented by density functional theory (DFT) calculations employing the B3LYP functional and the 6-311G (d, p) basis set. Theoretical vibrational frequencies showed strong agreement with experimental FT-IR spectra, with all vibrational modes accurately assigned using potential energy distribution (PED) analysis. NMR calculations referenced tetramethylsilane (TMS) for chemical shift predictions. Additionally, biochemical analyses revealed that DBHDE exhibits anti-hyperlipidemic properties, as it effectively reduces total cholesterol (TC) levels. Importantly, no evidence of liver or kidney damage was observed, as confirmed by parameters such as creatinine, alanine aminotransferase (ALAT), and aspartate aminotransferase (ASAT).

Keywords – DBHDE, DFT, FT-IR, NMR, UV-Vis.

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Spin-Spin Coupling and Fundamental State of a Mixed-Spin Cylindrical Ferrimagnetic Nanotube

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Abstract **–** The objective of this study is to predict the fundamental states privileged by a cylindrical ferrimagnetic Ising nanotube with a core-shell structure, composed of mixed spins (3/2 and 3). The coupling considered is spin-spin. The applied statistical formalism is based, on the one hand, on the mean-field approximation based on the Gibbs-Bogoliubov inequality, and, on the other hand, on the exclusive consideration of nearest-neighbor interactions.

The study explores the effects of various physical parameters, such as crystal fields, whether from the core or the shell, as well as internal or mixed exchange interactions, on the stability of the system. The results highlight the fundamental states privileged by the system at very low temperatures, as a function of the variation in each parameter. Jumps between states were also identified, testifying to first-order transitions.

Keywords – Cylindrical ferrimagnetic nanotube; Mixed spins; Mixed exchange interactions; Ising; Mean-field and Gibbs-Bogoliubov inequality.

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Generalized of Berger type Deformed Sasaki Metric On Tangent Bundle

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Abstract – Differential geometry is a branch of mathematics that focuses on the study of manifolds and their properties, through the use of calculus and algebra.

The bundle tangent to a manifold plays a keyrole in differential geometry. It becomes a space Riemannian more interesting when equipped with the Sasaki metric (the base manifold being assumed Riemannian). However, although it is "naturally" defined from the base metric, Sasaki's metric presents an extreme rigidity" with respect to the basic metric; this has been made natural the introduction of other Riemannian metrics on the tangent bundle (the Cheeger-Gromoll metric in is an example).

In this work, we introduce the geometry of tangent bundles in particular "the natural metrics on the tangent bundle". Our work aims the study of the more generalclass of naturalmetrics on the tangent bundle. This made it possible, among other things, to high light the properties of he redity of these metrics, an extreme rigidity of the elements of a subclass of these metrics and to obtain structures interesting geometries on the tangent bundle endowed with a natural metric of a certain type.

Keywords – Differential Geometry, Natrul metrics, curvatures,Levi-Civita connexion,bundle tangent.

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Adaptive Control Models for Electric Motors: Enhancing Efficiency in Autonomous Driving through Hyperstability Criterion

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Abstract **–** Autonomous Electric vehicles (AEVs) are a crucial breakthrough in the advancement of sustainable transportation. By leveraging renewable energy systems such as solar, wind, and hydroelectric power, long-term ecological sustainability objectives could be easily achieved. To reach these objectives, it is essential to develop a robust control system for the primary component that powers the vehicle, namely, the electric motor. The selected motor for this purpose is the Induction Motor due to its robustness, efficiency, and low maintenance requirements. This paper explores firstly the Indirect Rotor Field Oriented Control (IFOC) method. This method is implemented along with a PI controller. Subsequently, Model Reference Adaptive control via the Hyperstability Criterion is introduced followed by a detailed comparative analysis using MATLAB Simulink. This analysis is conducted to evaluate the performance of both control methods. The results convincingly demonstrate that the adaptive control strategy outperforms classical control approaches, making it an ideal choice for enhancing the efficiency and reliability of the Induction Motor in autonomous electric vehicles.

Keywords – Autonomous vehicles; Electric motors; Model Reference Adaptive Control; Hyperstability Criterion; indirect field-oriented control; renewable energies

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Evaluating the Impact of Free and Encapsulated Essential Oil Components on red blood cells

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Abstract – Essential oils are natural products widely recognized for their biological properties produced by plants as secondary metabolites, including antimicrobial, antioxidant, and anti-inflammatory activities. Among their numerous components, camphor stands out as a key volatile compound with a strong aroma and significant therapeutic potential. Found in various essential oils, camphor exhibits diverse biological activities, making it an important target for scientific research.

Erythrocytes are essential for oxygen transport and maintaining homeostasis in the body. Their interaction with essential oils has been the focus of several studies, as these oils can influence membrane integrity and cellular functionality.

Human red blood cells were used in this study. First the cells were centrifuged and washed with NaCl before use. Camphor, either in its free form or encapsulated, was prepared at different concentrations to assess its toxicity on red blood cells. The prepared samples were added to an RBC solution, and finely after incubation, absorbance was measured to determine the hemolysis rate.

The results showed that at low concentrations, camphor, whether in its free form or encapsulated, did not exhibit toxic effects on red blood cells. However, at higher doses, it became toxic, particularly in its encapsulated form. This increased toxicity can be attributed to the improved solubility provided by cyclodextrins, which allows for better diffusion of camphor in the solution.

Investigating the cytotoxicity and biological effects of essential oils, particularly camphor, on erythrocytes provides valuable insights into their therapeutic potential and safety profile.

Keywords –essential oil, Erythrocytes, encapsulation, cyclodextrin, cytotoxic evaluation

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A Comparative Analysis of Increasing the UCS Strength of Expansive Soil under Curing Conditions with Calcite, Tile Bond, and Plaster of Paris

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Abstract **-** Expansive clay soils are found all over the world and can seriously harm structures and infrastructure. Expanding soils have been stabilized using a variety of techniques and stabilizers to make them more useful for building. It's A comparison study describes an experimental study that aims to improve the mechanical qualities of expanding soil bystabilizing it using three different stabilizers, such as calcite, plaster of Paris (POP) and tile bond. The unconfined compressive strength (UCS) test is carried out at room temperature and14 days after close curing. The strength of UCS in expansive soil has increased. Plaster of Parisshows a significant strength rise, increasing from 270kPa to 485kPa 80% with 3% addition andby 64% at 5%. At 7% addition, calcite shows an increase of 412 kPa, resulting in a 52% strengthgain. While applying 5% tile bond, the 415kPa strength decreases and then increases by 53%.

Key words: Expansive Soil, Plaster Of Paris, Unconfined Compressive Strength.

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Existence and Continuous Dependence on Initial Conditions of Asymptotically Almost Automorphic Mild Solutions for Impulsive Integro-Differential Equations in Banach Spaces

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Abstract – In this article, we study the existence of asymptotically almost automorphic mild solutions of integro-differential equations with nonlocal conditions via resolvent operators in Banach space. Further, we give sufficient conditions for the solutions to depend continuously on the initial condition. Finally,an example is given to validate the theory part.

Keywords –, almost, automorphic, integrodifferential ,equation, Asymptotically.

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The effect of sulfate attack on precast concrete

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Abstract – The aim of our research is to solve two problems, the first is to accelerate the hardening of fresh concrete achieve values of strength in a few hours, around 70 to 80% strength to 28 days normal hardening. The second problem is to use energy as sources of heat, non-polluting meet the requirements of sustainable development policy and we opted to use solar energy to accelerate the hardening concrete. The sulfate attack (SA) mainly affects the cement paste by complex and coupled physicochemical mechanisms leading to mechanical degradation and ruin, often linked to expansion by the formation of products such as ettringite and gypsum. Three The sulfate attack protocols were applied for three types of precast concrete, concrete hardened in water at 28 days, the samples are immersed in a 5% H_2SO_4 solution at 20°C. The results show that the impact of the age of the material on its degradation on contact with the sulfuric acid solution was highlighted, visual observations then rapid degradation and abruptly on the surface and then in depth towards the heart then a loss of mass and cracking and finally the ruine of the concrete material.

Keywords – Accelerate hardening, solar energy, precast concrete, sulfate attack, degradation

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Geometrical description of two interacting spins under Ising model

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Abstract – In our recent work, we investigate these issues in a physical system of two interacting spins particles under the long-range Ising model. We discover the relevant dynamics, identify the corresponding quantum phase space, and derive the associated Fubini-Study metric. By applying the Gauss-Bonnet theorem and deriving the Gaussian curvature, we prove that the dynamics occur on a manifold with spherical topology. Subsequently, we analyze the geometrical phase acquired during arbitrary and cyclic evolution processes and solve the quantum brachistochrone problem by establishing the time-optimal evolution. Moreover, by focusing on a two-spin-1/2 system, we explore the relevant entanglement from two different perspectives. The first is geometric and involves examining the interplay between the degree of entanglement and the geometrical structures, such as the Fubini-Study metric, Gaussian curvature, and geometrical phase. The second is dynamic and addresses the effect of entanglement on the evolution speed and geodesic distance. Additionally, we resolve the quantum brachistochrone problem based on the degree of entanglement.

Keywords – Quantum dynamics, Quantum state space, Optimal-time evolution, Entanglement, Geometrical phase.

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Epidemic Potential of HIV: A Mathematical Approach to Transmission Dynamics and Control

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Abstract – The Human Immunodeficiency Virus (HIV) is responsible for acquired immunodeficiency syndrome (AIDS) and can be spread through various bodily fluids. This paper introduces a mathematical model to study the dynamics of HIV/AIDS transmission, utilizing partial differential equations and stability theory. It determines the basic reproduction number, which reflects the potential for an epidemic, through the next generation matrix. The research defines the conditions for both local and global stability of disease-free and endemic states. Findings indicate that when the reproduction number is below one, the system tends toward a disease-free state, whereas values above one suggest the existence of endemic conditions. Additionally, the model performs sensitivity analysis on critical parameters influencing transmission dynamics and integrates optimal control strategies, including prevention and treatment efforts. Numerical simulations are carried out, with the results illustrated graphically and discussed in quantitative terms.

Keywords – Reaction-diffusion system, pidemic potential, sensitivity analysis, HIV, stability

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Modeling the Impact of Multiple Infections on Viral Competition and Diversity: Insights into CTL Dynamics and Antiretroviral Therapy

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Abstract – The research investigates how multiple infections affect the competition between wild-type viruses and immune escape mutants, which plays a role in viral diversity. A mathematical model is created to examine the interactions of two viral strains under multiple infections. The main findings show that although viral dynamics are similar at different infection levels, competition becomes more intense with quadruple infections. Sensitivity analysis indicates that the strength of cytotoxic T lymphocytes (CTLs) has a significant impact on viral loads, with intermediate CTL levels leading to reduced overall viral load. The study suggests that both weak and strong CTL responses can result in increased viral loads and highlights that overlooking multiple infections may cause underestimations of viral loads in combination antiretroviral therapy (cART). This research provides insights into the intricate dynamics of viral infections and their relevance for treatment approaches.

Keywords – reaction-diffusion system, competition dynamics, sensitivity analysis, HIV, stability, CTL Dynamics

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Development, structural characterization, and Hirshfeld surface analysis of a novel Schiff base, N-[(E)-(2,3-dihydroxyphenyl)methylidene]-4H-1,2,4-triazol-4-amine, with demonstrated antioxidant properties

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Abstract – Schiff bases are compounds with the general formula R1R2C = NR3 where the nitrogen atom is linked to an aryl or alkyl group. This family of compounds is classified according to the nature of the aliphatic or aromatic radicals.

Our team has carried out a number of studies on the synthesis, structures and properties of this family of compounds. We can cite as examples the work of benarous et al (2015), moussa selimane et al (2015), bouhidel et al (2018), maza et al (2020) .

In this study, we present the structure determined by X-ray diffraction and the antimicrobial properties on four strains (two Gram-positive and two Gram-negative) of a new Schiff base obtained in the course of our work, which is formed on the basis of a triazole ring and a phenol, linked by a C=N imine function.

The study of Hirshfeld surfaces enabled us to highlight the importance of hydrogen bonds in the construction of the crystalline stacking of this structure.

Keywords – schiff base, azomethine,x ray diffraction,Hirshfeld surfaces, antioxidant properties.

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Valorization of Prickly Pear Liquid Waste for Bioethanol Production

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Abstract **–** The agri-food industry generates significant waste, often causing environmental pollution. However, these sugar-rich residues offer valuable raw materials for fermentation, leading to metabolites like ethanol and organic acids. This research aims to valorize liquid prickly pear waste as a substrate for bioethanol production through anaerobic bioconversion with *Saccharomyces cerevisiae. Batch fermentations were conducted at 31°C and 37°C for 72 hours. A later study of sugar concentration effects at 37°C revealed that temperature optimization enhances cellular metabolism, increasing bioethanol yields. At 31°C, the initial pH dropped from 4.16 to 3.85, while at 37°C, it fell from 4.15 to 3.4, primarily due to CO_2 and bioethanol accumulation. Total sugars decreased by 60.17% at 31°C and by 97.63% at 37°C, highlighting optimal nutrient assimilation at higher temperatures. Cell concentration reached 448 × 10^5 cells/mL at 37°C and 368 × 10^5 cells/mL at 31°C, showing favorable yeast growth at higher temperatures, despite reduced viability due to ethanol accumulation. Infrared analysis confirmed the presence of characteristic ethanol groups such as CH, OH, and CO. This study supports bioethanol production from agri-food waste, offering potential industrial and environmental benefits.

Keywords – Fermentation, Saccharomyces cerevisiae, Bioethanol, Waste valorization.

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Application of a Bio-Nanoparticle as an Adsorbent for Removing Toxic Synthetic Dye

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Abstract – This study investigates the production of a bio-nanoparticle and its application as an efficient adsorbent for the removal of a toxic synthetic dye pollutant. The bio-nanoparticle was synthesized using environmentally friendly methods and tested under various experimental conditions to optimize its adsorption capacity. Key parameters evaluated included contact time, pH, adsorbent dosage, agitation speed, pollutant concentration, and temperature. The adsorption behavior was analyzed through three isotherm models: Langmuir, Freundlich, and BET. The Langmuir model, which assumes monolayer adsorption, provided insights into the maximum adsorption capacity. The Freundlich model was used to evaluate the adsorption intensity, and the BET model helped describe multilayer adsorption in certain conditions. To understand the adsorption mechanism, kinetic studies were conducted using pseudo-first-order, pseudo-second-order, and intra-particle diffusion models. The pseudo-second-order model best fit the experimental data, indicating chemisorption as the dominant mechanism. Our results highlight the bio-nanoparticle's excellent potential as an eco-friendly and cost-effective adsorbent for removing synthetic dyes from wastewater. Optimization tests showed that adsorption efficiency was significantly influenced by pH, temperature, and bio-nanoparticle dosage. These findings suggest that the developed bio-nanoparticle is a promising tool for environmental pollution control, particularly in industrial wastewater treatment.

Keywords – Bio-nanoparticle, Adsorbent, Synthetic dye, Isotherm models, Adsorption kinetics

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Performance of Wind Flow for Activating Natural Ventilation on different Hostel Building Forms in Nigeria

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Abstract – Most regions in Nigeria are notable for the hot and humid environments. This is attributed to the major weather factors which in turn influences the indoor thermal comfort of occupants. Owing to the economic constraints in the country, the choice of active air conditioning is often not realizable in public university halls of residence. This leaves designers in this region with the only other option of passive cooling applications in hostel building designs. Study identified that natural ventilation processes is mostly dependent on regional windflow systems for wind driven ventilation. This paper examines the impact of windflow systems around different building configurations adopted in the design of hostel buildings in most Nigerian public universities. The atypical behavior of air movement which is necessary for activating passive ventilation within these building forms is studied and the results justified the effectiveness of building orientation for functional indoor ventilation.

Keywords – Passive ventilation, Hostel designs, Nigerian university hostels, natural ventilation, wind flow systems

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Multi-class Support Vector Machines for OFDM Adaptation with Massive MIMO

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Abstract **–** In massive MIMO systems, matching transmitters to modulation orders and coding rates enables high-throughput link matching. However, creating a practical mathematical mapping model from environmental variables to transmitter parameters and optimizing transmitter parameters in both directions is challenging, as is the complexity required for each model to accurately capture and account for all factors that affect performance. Machine learning algorithms, which make no mathematical assumptions and only use past observations to model the relationship between inputs and outputs, have recently been investigated for adaptation in massive MIMO systems. In this paper, we propose a new machine learning algorithm based on multi-class support vector machines (SVM). Our algorithm has much lower operational overhead and link matching performance, and we show that our new algorithm outperforms existing machine learning-based algorithms. Outperforming

Keywords – Support vector machines , Machine learning algorithms , OFDM , Modulation ,massive MIMO

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Biogas and Biosorbent Production from Urban Wastewater Sludge: A Sustainable Valorization Approach

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Abstract – Wastewater treatment is a pressing challenge for modern societies, requiring efficient methods to ensure water purification and a reliable potable water supply, while also addressing the critical issue of sewage sludge management. This study explored electrocoagulation for wastewater treatment and the valorization of the resulting sludge through energy conversion and biosorbents via a pyrolysis process. Laboratory experiments demonstrated the efficiency of electrocoagulation in treating high-organic-load effluents, with in situ formation of coagulant agents and electroflotation facilitating the recovery of suspended solids and fats. For urban wastewater in Beni-Messous, the process achieved COD removal rates of 1000–3800 mg/L, TOC removal of 57.30–69.99 mg/L, and over 99.9% removal of oils and fats, meeting discharge standards without further adjustments. Turbidity removal efficiencies reached 99.9%, ensuring significant decolorization. The sludge produced was further valorized to obtain CNTs as biosorbents for pollutant adsorption, such as Cr (VI) and Pb (II), and for biogas production. Biogas fermentation experiments showed optimal production at a pH of 6–7, though additional treatment is required to refine the biogas composition for practical applications. This study highlights the potential of combining electrocoagulation with sludge valorization as an innovative and sustainable solution for wastewater management and resource recovery.

Keywords – Sludge, *electrocoagulation, biogas, bosrobent, pollutant.*

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A new investigation into hydrogen recovery and applications in the petroleum sector

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Abstract **-** The switch to sustainable energy sources is essential to addressing the world's environmental problems. Since hydrogen (H2) is a crucial energy carrier in this transition, it appears to hold promise. However, mechanical and chemical factors make electrolysis of subterranean water difficult. Using MATLAB simulations, this study explores these complexities and highlights how crucial it is to forecast H2 production and maximize electrolysis efficiency. In order to achieve this goal, over 20 experiments used complex subterranean water to investigate how chemical reactions affect electrolysis. It was essential to use the FM experiment to study treatment effects and to have a sufficient direct current (DC) power supply. The difficulties of using H2 in perforation and fracturing operations are also examined in this work, with a focus on the necessity of research, tool development, and process improvement to guarantee safety and reduce environmental impact. The need for a thorough comprehension of the electrolysis process in the energy transition to hydrogen is thus highlighted by this study. It draws attention to the difficulties in electrolyzing subterranean water, the significance of accurate treatments and forecasts, and the function of mechanical and chemical parameters. A successful and sustainable energy transition can be facilitated by optimizing H2 production by taking these factors into consideration.

Keyword : Gibbs energy, electrolysis, HSPEU, electrolysis FM experiment, Hydrogen, perforation, fracturing.

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The laboratory study focuses on the production of green hydrogen and simulates a newly designed exportation process

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Abstract **-** The study consists to investigate groundwater electrolysis using the ML-01 model and suggest creative solutions in order to design an HSPEU installation and conduct hydrogen production experiments. By conducting electrolysis on two distinct water samples under varied conditions, the aim of this work is to determine the operating efficiency of the ML-01 model (likely a model to predict electrolysis performance). Additionally, it suggests ways to make the process more environmentally friendly and offers a design for the HSPEU facility that combines electrolysis and methane cracking, most likely to lessen reliance on fossil fuels. The experiment's findings demonstrate that the model's efficiency can reach 42°C and 18V of voltage simultaneously. Lastly, the ASPEN PLUS software simulates these outcomes.

Keywords : Green hydrogen, model, HSPEU facility, ASPEN PLUS software, ML-01 model.

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Extraction of Ni(II) and Co(II) using the emulsified liquid membrane (ELM) technique

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Abstract – Experiments were carried out to extract Ni(II) and Co(II) ions using a quaternary amine extractant (Aliquat336). The chemical process used is the emulsified liquid membrane (ELM) technique. The process study revealed the optimization of experimental parameters for extracting metal ions in their equimolar mixture. These metal ions were separated from their synthetic mixture. The results showed that cobalt and nickel could be extracted at 64.09% and 100% respectively from their equimolar mixture.

Keywords – Emulsion liquid membrane, Nickel, Cobalt, Span80

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Identify And Authenticate People Using Biometric Techniques In The Smart City

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Abstract – There are many different biometric techniques used in many applications in the modern environment of a smart city, which can be classified into three broad categories: physiological biometrics, behavioural biometrics and biological biometrics. Physiological measurements are based on the identification of specific physiological characteristics obtained from several parts of the human body. This category includes fingerprints,the palm print, hand geometry, facial features and more, They are unique and permanent for each individual. the palm print technique, for example, uses the inside surface of the palm to identify and/or verify people. It is well suited to medium-security systems and physical or logical access control. Behavioural measurements are based on the analysis of certain behaviours of a person. This category includes voice recognition, keyboard typing dynamics, signature dynamics. Signature recognition is an automatic method of measuring people's signatures. It is generally based on the fact that the user signs with an electronic pen on a graphic palette and at the same time checks the dynamic set, such as the speed, the length of time the pen is in contact with the paper, the time taken to sign and the position of the lifting pen on the paper. Biological measurements are based on the internal characteristics of each individual, such as DNA and smell. In this paper gives a brief overview of the most common biometric technologies, highlighting their advantages and disadvantages in terms of cost and reliability, and application of biometric techniques for identifying and authenticating individuals within smart city frameworks.

Keywords – Biometrics, Biometric techniques, smart city, Palm print, Finger prints, Identification, Authentication.

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An Intelligent Guidance System for Mobile Robot with CNN-Based Signboard Recognition

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Abstract **–** Intelligent mobile robots have increasingly been utilized across various fields, driven by advancements in deep learning and computer vision, which have significantly enhanced their capabilities. This paper presents an intelligent guidance system for a mobile robot navigating a predefined path marked with signboards. The system employs a visual servoing approach utilizing a PIXY camera as the trajectory sensor, a Raspberry Pi as the robot's processing unit, and an Arduino board for motor control. Artificial intelligence (AI) techniques, specifically a Convolutional Neural Network (CNN) model, were integrated to enable signboard recognition with an accuracy of 0.998. To further optimize performance, the Intel Neural Compute Stick 2 (NCS2) was employed for hardware acceleration, reducing processing time and alleviating computational load on the Raspberry Pi.

The proposed system demonstrated efficient trajectory tracking and accurate signboard detection, resulting in optimized robot guidance within the designated environment. Experimental evaluations confirmed the high precision and robustness of the implemented solution, validating the functionality of the enhanced robotic platform. Moreover, the integration of the NCS2 not only improved execution speed but also increased the robot's autonomy, paving the way for potential extensions to additional tasks.

Keywords – Mobile robots; guidance system; computer vision; CNN.

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Electrochemical Characterization Of A Modified Electrode For The Detectıon Of An Organic Pollutant In Aqueous Media

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Abstract **–** Organic pollutants, such as endocrine disruptors, pose risks to human health and marine ecosystems. Benzophenone, commonly used in cosmetics and plastic packaging, is an example of these disruptors. It is crucial to develop effective monitoring methods, and electrochemical sensors show promise for detecting benzophenone in the environment.

The objective of this work is the characterization of an electrochemical sensor designed for the detection of benzophenone in aqueous media. After developing a functionalized electrode with a sensitive membrane, we characterized it using cyclic voltammetry and electrochemical impedance spectroscopy. The experimental setup employs a three-electrode electrochemical cell consisting of a saturated KCl reference electrode, a platinum wire auxiliary electrode, and a working electrode (either modified electrodes or bare platinum electrode).

The results obtained through cyclic voltammetry show that the bare platinum electrode exhibits significant current intensity, confirming that bare platinum is a good metallic conductor and can be used as a transducer. After the deposition of polymeric membranes on the surface of the platinum electrode, the current intensity decreases, revealing that the polymeric membranes form a layer blocking current flow and confirming the formation of these membranes. Upon injection of the pollutant, the current intensity of the electrode modified with the sensitive polymeric membrane increases, certifying the sensitivity of the developed sensor to benzophenone.

Electrochemical impedance spectroscopy confirms the results obtained by cyclic voltammetry. This allows us to conclude that the present device can be applied for in situ monitoring of wastewater containing benzophenone.

Keywords – Cyclic voltammetry; electrochemical impedance spectroscopy; modified electrode; sensitive membrane; benzophenone.

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Sustainable Removal of Mixture Cationic Dyes from Textile Effluents Using Cocoa Shell: A Low-Cost Adsorbent Approach

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Abstract **–** The textile industry generates significant quantities of wastewater containing toxic and non-biodegradable cationic dyes. This study investigates the potential of cocoa shells, an abundant and low-cost agricultural by-product of the chocolate industry, as a sustainable adsorbent for removing a mixture of cationic dyes from aqueous solutions. The cocoa shell was characterized using FTIR and SEM analysis techniques. Adsorption experiments were conducted under different parameters, including pH, contact time, initial dye concentration, and adsorbent dosage, to optimize removal efficiency. Results demonstrated that the cocoa shell achieved a removal efficiency of over 90% under optimal conditions. Kinetic and isothermal studies revealed that the adsorption process follows a pseudo-second-order kinetic model and fits the Langmuir isotherm, indicating monolayer adsorption. This research highlights the potential of utilizing cocoa shells as an eco-friendly and cost-effective solution for treating textile effluents, contributing to sustainable wastewater management practices.

Keywords – Mixture, Adsorption, Cocoa shell, kinetic study

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Study Underestimation of IES in 5G networks by massive MIMO with COFDM

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Abstract – wireless communication systems has become one of the common research subjects according to its important role in almost all the fields starting with communications and coming to commerce, industry even security and health with the new network generation the 5G The purpose of those studies is to response to the client desire of having a good service quality beside high bit rates, and to offer the service to the most possible by increasing the capacity of the system using a multiple of new technologies. This process is divided on 3 essential steps. First, channel estimation, which is a technique that allows knowing the coefficients of the different sub-channel, and then to know our transmission channel in a way that the transmitted signal will be recovered at the reception easily, and it helps also to reduce the effect of multipath channel. Secondly, the use of the MIMO Massif presents the optimal solution to achieve the huge desired system capacity, the high speed transmission. Finally, The Beamforming antenna array technologies are used to eliminate and resolve the many technical hitches that MIMO Massif system implementation faces.

Keywords – COFDM, IES, 5G, beamforming, *OFDM , Modulation, massive MIMO*

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Machine Learning Technique for hybrid multiplexing approach of MIMO COFDM multi-user systems

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Abstract – In this work, we focus on 5G-based machine learning, leveraging SVD-assisted multi-user transmitter (MUT) and multi-user detector (MUD) techniques using downlink (DL) transmission network pre-processing and reception post-processing. Combined with MIMO OFDM Block code with 5G-based machine learning. (STPC). We also propose pre-coded DL transmission schemes, in which both schemes exploit the channel state information (CSI) of all base station (BS) users, but only the CSI (MS) of the mobile station, decomposing the MIMO MU channel into a single parallel channel. At the output (SISO), these two proposed schemes are compared with a vertical spatial layer stamp detector (V-BLAST) integrated with OFDM STBC (V-BLAST STBC OFDM). Our simulation results for the hybrid approach show that the proposed scheme with a Zero-impact (ZF) DL transmitter outperforms the V-BLAST STBC OFDM and DL schemes precoded with ZF receivers in frequency-selective fading channels, respectively. This hybrid approach thus exploits temporal, spatial and frequency diversity.

Keywords – SISO,BLAST STBC,OFDM,MIMO,CSI

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Natural Convection in a Square Cavity Filled with a Nanofluid and Subject to Sinusoidal Heat Flux on the Upper Wall

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Abstract – The main aim of the present work is to study natural convection of CuO/water nanofluid inside a square cavity with sinusoidal temperature gradient using lattice Boltzmann method (LBM). LBM on this case is applied to perform an investigation on the effects of sinusoidal temperature gradient on nanofluid flow and heat transfer with different relevant parameters, such as the Rayleigh number (Ra), and the volume fraction of the nanoparticles (Φ). LBM has emerged as an effective approach for simulating convective BCs. It is found that the addition of nanoparticles improve the natural convective heat transfer, where the biggest heat transfer rate at high Ra. The physical model and numerical results are original and new. The obtained results can be used as a future reference for further investigation and related practical application. The main contribution of this investigation includes giving the initial prediction and providing the numerical data for the other researchers for their future reference regarding the effects of sinusoidal temperature gradient on the nanofluid flow and heat transfer in a cavity.

Keywords – Lattice Boltzmann method, Natural convection, Nanofluid, Square cavity, Sinusoidal Temperature Gradient

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The Multilingual Mosaic of Lahore: Exploring Linguistic Diversity in Urban Signage

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Abstract – This study examines the linguistic landscape of Lahore, Punjab, Pakistan, focusing on the usage and preferences of languages displayed on public signage. It explores the prevalence of various languages, localized adaptations of English, and emerging linguistic trends in the city. The research employs a linguistic landscape framework to analyze text-based signage across three market areas of Lahore, selected using convenience sampling due to uniformity in linguistic patterns across the city. Purposive sampling was applied, focusing exclusively on text-based displays. A total of 300 photographs were captured using a digital camera, later refined to 220 by excluding blurred or duplicate images. Data analysis followed the analytical parameters proposed by Cenoz and Gorter (2006), with additional insights drawn from Landry and Bourhis (1997) for unit identification. The analysis highlights the linguistic diversity of signage, including the prominent use of Urdu, English, and Arabic, with minimal representation of Punjabi. English appeared in various forms, such as transliteration, code-mixing, and direct usage, alongside the integration of foreign words. The findings emphasize the dominance of bilingualism and multilingual expressions within Lahore's linguistic landscape. This research contributes to a deeper understanding of linguistic trends in urban Pakistan and provides a foundation for further exploration in this area.

Keywords – Linguistic landscape, signage, language use, bilingualism, urban trends

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Bisphenol A induces redox status and apoptosis pathway in thymocytes and alters blood immune cells profile in rats: the protection role of catechins

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Abstract – This study aimed to evaluate the effects of chronic bisphenolA (BPA) (0,05 mg/kg) Bisphenol A (BPA) is a chemical compound used in the industrial synthesis of plastics and resins used in the manufacture of many food products packaging. BPA leaks easily from its containers into foods or drinks, and can thus be ingested and be a human health hazard. This current study aimed to evaluate the effects of chronic BPA exposure on the integrity of thymus cells and the blood immune-inflammatory indicators status in rats. On the other hand this study reports also assessment of the cytoprotection potential of catechins versus the BPA adverse effects. *24 female Wistar albinos* were distributed into 4 groups of 6 rats each. Control group received corn oil, Catechin (CTH) group was given 50 mg/kg, BPA group received 5 mg/kg of bisphenolA, and mixture (MIX) group was gavaged with combination of BPA and CTH at the same previous doses. Animal treatments were given daily during 90 days. Blood immune-inflammatory parameters and redox, apoptosis status and histology have been explored. Blood Interleukin-7, Interleukin-12, CRP, Lymphocyte profiles were determined, besides, the assessment of oxidative stress and apoptosis indicators such SOD, CAT, GST, GSH, MDA, Caspases 9,7 , Bcl2, Bax and Cyt-c in thymus cells. The results of this study showed that BPA induced a loss of redox status homeostasis of thymus cells and caused thymus cell injuries evidenced by activating lipoperoxidation and triggering apoptosis and histological profile changes that CTH restored. In conclusion, BPA altered Redox homeostasis and trigger apoptosis. CTH demonstrated a potential to restore these abnormalities.

Keywords: Bisphenol A, Thymus, rats, blood immunity, oxidative stress, apoptosis.

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Assessment of Microstructure of Nanocomposites through Scanning Electron Microscopy, X-ray Diffraction, Thermogravimetric Analysis, and Fourier transform infrared spectroscopy

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Abstract – The geopolymer composite (GC) mortars have emerged as a promising alternative to traditional cement in promoting sustainable and eco-friendly construction practices. To facilitate the practical use of fiber-reinforced (FR) GC mortars, enhancing their microstructural properties through the incorporation of micro-fibers and nano-particles is critical. This research focuses on improving the microstructural characteristics of fly ash-based GC mortars reinforced with micro basalt fibers (BF) by incorporating varying amounts of nano-Titania. GC mortars were prepared using four Titania dosages (ranging from 1% to 4%) along with 2 wt.% of BF. Additionally, a control mix containing 2% BF but no Titania was produced for comparison. To assess the GC formulations' performance and microstructural characteristics, Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), Scanning Electron Microscopy (SEM), and X-ray Diffraction (XRD) were used.

Keywords – Geopolymer mortar; nano-Titania; durability performance; X-ray Diffraction (XRD); structural analysis; mechanical properties; sustainability

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Optimizing BLDC Motor Control in Electric Vehicles Using Robust Predictive Strategies

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Abstract – The transition to electric vehicles (EVs) necessitates highly efficient and robust control strategies to ensure optimal performance of key components like the Brushless DC (BLDC) motor, which is widely favored for its high efficiency, reliability, and low maintenance requirements. This paper presents a robust predictive control strategy tailored for BLDC motors in EV applications, addressing the challenges posed by nonlinearities, parameter uncertainties, and external disturbances typical in EV operating environments. The proposed control approach integrates predictive modeling with robust control techniques to achieve precise speed and torque regulation under varying load and environmental conditions. Simulations validation demonstrate the effectiveness of the strategy in enhancing motor performance, stability, and energy efficiency, even in the presence of significant disturbances and model uncertainties. The findings underscore the potential of robust predictive control to contribute to the reliable and efficient operation of BLDC motors in electric vehicles, advancing the performance and longevity of EV powertrains.

Keywords – Electric vehicles; Brushless DC motor; predictive control strategy

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Enhancing Electric Vehicle Performance with Current-Based Model Predictive Control of BLDC Motors

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Abstract – Current Model Predictive Control (MPC) has emerged as a powerful control strategy for Brushless DC (BLDC) motors, particularly in electric vehicle (EV) applications. This approach leverages the dynamic model of the BLDC motor to predict future behavior and optimize control inputs in real-time. By addressing key challenges such as torque ripple minimization, efficient energy utilization, and precise speed regulation, MPC enables enhanced performance and durability of EV drivetrains.

This paper delves into the integration of MPC with BLDC motors in EVs, focusing on its ability to handle system constraints, manage multi-variable dynamics, and ensure robustness against parameter variations. Simulation results demonstrate improved torque control, reduced switching losses, and superior trajectory; frameworks are pivotal for advancing EV efficiency and reliability while meeting stringent regulatory requirements.

Keywords – Current Model Predictive Control ; electric vehicle; Brushless DC (BLDC) motors.

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The Detrimental Effects of Salt Stress on Plant Growth and Productivity

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Abstract **–** This paper provides a comprehensive examination of the physiological and biochemical mechanisms by which salt stress can profoundly impair plant growth, development, and productivity, with a particular focus on major crop species such as wheat, rice, and corn. It further explores a range of practical management approaches, including advanced soil management techniques, targeted breeding efforts to develop salt-tolerant crop varieties, and the integration of precision agriculture technologies, as well as future research directions that hold promise for mitigating the negative impacts of salinity on global agriculture and ensuring long-term food security. The paper also highlights the critical importance of developing innovative strategies and significantly advancing research to address the growing threat of salt stress, in order to maintain and enhance global food production capabilities in the face of this escalating challenge. Moreover, the paper offers an in-depth analysis of the wide-ranging and detrimental effects of salt stress on key physiological and biochemical processes in plants, and presents a comprehensive set of solutions to help address this pressing issue in modern agriculture, which is essential for safeguarding global food supplies.

Keywords – Stress, Salt, Field Crops

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HACCP Perspektifinden Gıda Güvenliği ve Çevresel Sürdürülebilirlik İlişkisi

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Özet – Gıda üretim süreçleri, insan sağlığını koruma ve yeterli besin sağlama açısından kritik bir öneme sahiptir. Ancak, bu süreçler aynı zamanda çevre üzerinde ciddi etkiler doğurabilmektedir. Yüksek enerji ve su tüketimi, atık oluşumu ve kimyasal kullanımı gibi unsurlar, gıda üretiminde sürdürülebilirliğin sağlanması gerektiğini ortaya koymaktadır. Bu bağlamda, hem gıda güvenliği standartlarının uygulanması hem de çevresel etkilerin azaltılması için bütüncül yaklaşımlara ihtiyaç duyulmaktadır. HACCP (Tehlike Analizi ve Kritik Kontrol Noktaları), gıda güvenliği risklerini belirlemek ve önlemek için kullanılan etkin bir sistemdir. HACCP, gıda üretim zincirinin tüm aşamalarında kontrol noktaları oluşturarak tüketiciye güvenli ürün sunulmasını sağlamaktadır. Bununla birlikte, HACCP'in yalnızca gıda güvenliği değil, çevresel sürdürülebilirlik açısından da önemli katkılar sunduğu göz ardı edilmemelidir. HACCP uygulamaları sayesinde enerji verimliliği artırılabilir, atık oluşumu azaltılabilir ve doğal kaynakların daha bilinçli bir şekilde kullanımı sağlanabilir. Bu çalışmada, gıda güvenliği ve çevresel sürdürülebilirlik arasındaki ilişki ele alınmaktadır. HACCP gibi sistemlerin yalnızca gıda üretiminde değil, çevre sağlığının korunmasında da oynadığı rol vurgulanmıştır. Gıda üretiminde sürdürülebilir yöntemlerin benimsenmesi, toplum sağlığını korumanın yanı sıra doğal kaynakların korunmasına ve iklim değişikliğiyle mücadeleye de katkı sağlayacaktır. Bu nedenle, çevre mühendisliği ve gıda mühendisliği disiplinleri arasında güçlü bir iş birliği kurulması gerekliliği bir kez daha ortaya çıkmaktadır.

Anahtar Kelimeler – Gıda Güvenliği, HACCP, Sürdürülebilir Çevre, Çevresel Sürdürülebilirlik, Atık Yönetimi

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Gemi Atık Yağlarının Karayolu Taşınması Sırasındaki Çevresel Etkilerinin Değerlendirilmesi

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Özet – Gemi atık kabul tesislerinde susuzlaştırılan atık yağların distilasyon ünitesi bulunan tesislere taşınması, uygun yönetim stratejileri gerektiren önemli bir süreçtir. Bu çalışmada, atık yağ taşımacılığı sırasında ortaya çıkan çevresel etkiler değerlendirilmektedir. Veriler; taşınan atık yağların hacmi, su oranı, net yağ miktarı ve yoğunluk değerlerini içermektedir. Örneğin, 2024 yılı Kasım ayında analiz edilen verilere göre taşıma tankerlerinin %2 ila %6 oranında su içerdiği ve net yağ miktarının yoğunluğa bağlı olarak 28,42 m³ ile 30,38 m³ arasında değiştiği gözlenmiştir.

Atık yağ taşımacılığı, taşıma sırasında emisyonlara neden olan karayolu lojistiğine dayanmaktadır. Bu süreçte, CO_2, NO_x ve diğer zararlı gazların yayılımı göz önünde bulundurulmalıdır. Ayrıca, yağların yoğunluğu ve su içeriği, taşınan yük miktarını etkileyerek yakıt tüketimi ve dolaylı olarak karbon ayak izini artırmaktadır.

Çalışmanın sonuçları, taşımacılık sırasında çevresel etkilerin minimize edilmesi için düşük su oranlı yağların seçimi, rotaların optimize edilmesi ve alternatif yakıtların kullanımını önermektedir. Bu öneriler, taşımacılığın çevresel etkilerini azaltmakla kalmayıp aynı zamanda ekonomik faydalar da sağlamaktadır. Atık yağ taşımacılığının çevresel etkileri üzerine yapılan bu analiz, daha sürdürülebilir bir yönetim yaklaşımı geliştirilmesi için yol göstermektedir.

Anahtar Kelimeler – Atık Yağ, Susuzlaştırma, Karayolu Taşımacılığı, Çevresel Etki, Distilasyon

Teşekkür: Bu çalışmada kullanılan verilerin temin edilmesindeki katkılarından dolayı İSTAÇ A.Ş.'ye, Deniz Hizmetleri Müdürü Sayın Alper Ayar'a ve Gemi Atıkları Toplama ve İşleme Şefi Sayın Hayrettin Gürova'ya teşekkür ederiz.

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Numerical Assessment of the Impact of Thermal Residual Stresses on the Performance of Bonded Composite Repairs for Metallic Aircraft Structures

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Abstract **–**To prolong the service life of aging aircraft, a promising repair technique involves using composite patches to strengthen cracked aluminum parts. These composite laminates are advantageous due to their resistance to corrosion, flexibility, ease of fabrication, and high specific strength and modulus. The process of bonded composite patch repair begins with heating the area to be patched above room temperature and then cooling the fully cured patch, which is considered rigidly bonded to the aircraft structure, back to ambient temperature. For example, in typical aircraft structure repairs, the affected area is heated to around 100 ± 20 °C under pressure for about an hour, followed by cooling to room temperature after the adhesive has cured. Due to the differing elastic properties and thermal expansion behaviors of the composite patch and metal plate, thermal residual stresses can develop. This study utilizes the Finite Element Method to assess the effects of these thermal residual stresses from the adhesive curing process on the efficacy of bonded composite repairs in aircraft structures. The stress intensity factor at the crack tip is selected as a criterion for evaluating the effectiveness of the repair. Findings suggest that thermal residual stresses notably reduce the performance of repairs, leading to a decreased fatigue life of cracked components. Furthermore, the study explores how factors such as curing temperature, adhesive characteristics, and adhesive thickness affect the relationship between the stress intensity factor and thermal stresses.

Keywords –Residual thermal stresses, stress intensity factor, bonded composite repair, adhesion, finite element method

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Assessing the Impact of Limestone on Virgin Cork Concrete's Strength and Durability

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Abstract - The global construction industry's increasing use of concrete has significantly raised energy consumption, intensified climate change, and exacerbated environmental challenges such as heatwaves and droughts. Moreover, the durability of reinforced concrete structures faces serious threats from steel reinforcement corrosion due to chloride ion penetration.

Building on prior studies that replaced 25% of conventional aggregates with virgin cork to enhance thermal insulation, this research evaluates the durability and mechanical performance of these materials with the addition of 10% limestone. Six concrete mixes were designed, maintaining a water-to-cementitious materials ratio of 0.45: ordinary concrete, dry cork concrete, wet cork concrete, and their respective combinations with limestone.

The results showed that while adding virgin cork slightly reduced mechanical strength compared to traditional concrete, incorporating limestone improved these properties. Both virgin cork and limestone demonstrated potential as sustainable construction materials, meeting RILEM's lightweight concrete standards.

Porosity and capillary absorption tests revealed that limestone significantly reduced these values. Although the diffusion coefficient increased with the use of dry or wet cork, combining cork with limestone effectively lowered it. The lowest diffusion coefficient was observed in wet cork concrete combined with limestone.

Overall, the findings suggest that dry cork concrete with limestone offers superior mechanical strength, reduced porosity, and minimal capillary absorption, while wet cork concrete with limestone excels in mitigating chloride penetration, enhancing long-term durability. Further research is necessary to better understand the behavior and properties of wet virgin cork concrete.

Keywords – Bio-based concrete, Virgin cork, Limestone, Diffusion coefficient, Durability.

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Mesure of optical properties of Sb_2O_3-PbO-MoO_3 glasses

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Abstract- Heavy metal oxide (HMO) glasses have recently had high research activities due to their good physical and chemical properties. They possess: low phonon energy, a refractive index higher than traditional glasses like borosilicate and phosphate glasses, and a chemical durability better than fluoride glasses. Further, they are transparent in near, middle infrared, and visible spectra, which puts them at the first-choice materials for photonics, optoelectronics, sensors, and nonlinear optical devices.[1-3]

New ternary glasses with the composition of (90-x) Sb2O3-10PbO–xMoO, for x = 10, 20, and 30 mol%, have been prepared by a melt quenching method. A good stability against devitrification has been confirmed by differential scanning calorimetry (DSC). The glass's density measurement exhibits density increases with rising MoO3 content in the glass. And measure UV-Visible, explain the changement gap energy a function of concentration MoO3 oxide.

Key Words: Heavy metal oxides, Antimony glasses, molybdenum, Thermal properties

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Application of Green Chemistry in the Synthesis of new Heteronaphthoquinone

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Abstract – Due to their unique physical and chemical properties, quinones and their derivatives play a vital role in chemical, environmental, and pharmaceutical applications . Quinones and their derivatives are biologically active compounds . They are widely presented in nature . They are mainly obtained from plants, animals, bacteria, and fungi in both the direct way and in indirect ways. The exploration of modern organic chemistry is constantly pushing back the frontiers of knowledge, creating fascinating and revolutionary opportunities in various scientific and industrial fields. Indeed, the current trend in organic chemistry is towards "clean chemistry" or "green chemistry", aimed at reducing the environmental impact of chemical synthesis by using more sustainable methods and non-toxic solvents. We plan to synthesize and valorize new chemically functionalized of 2-Amino-Benzofuran-(5H)-ones with a 1,4-Naphtoquinone and an active methylene in the presence of a base using "green chemistry" criteria: Vilsmeier-Haack reaction, multi-component reaction, solvent-free reaction, M.O. irradiation reaction, one-pot reaction, heterogeneous catalysis. Also, a study of the antimicrobial activity (antibacterial and antifungal) of these new 5/6-chain heterobicycles. The reaction is easy and doesn't take long time (2h-4h) in 40-50°C maximum and yields were moderately good, we performed Infrared (IR) characterization with (KBr) and Nuclear Magnetic Resonance of proton (NMR).

Keywords – active methylene, 2-Amino-Benzofuran-(5H)-ones, green chemistry, 1,4-Naphtoquinone, one-pot reaction .

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Development of Polyester-Supported Zero-Valent Silver/Jujube Carbon Catalysts for the Reduction of 4-Nitrophenol

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Abstract – The objective of this research was to design an innovative heterogeneous catalyst, designated as PE-AC/Ag^0, through the modification of polyester (PE) fabric with activated carbon (AC) nanosheets decorated with silver nanoparticles. AC nanosheets were integrated into PE fabric using sonication, and silver nanoparticles were subsequently deposited and reduced in situ on the AC surface to produce PE-AC/Ag^0. The catalytic performance of PE-AC/Ag^0 was assessed through the hydrogenation of 4-nitrophenol (4-NP) in the presence of sodium borohydride ($NaBH_4$). Experimental results indicated that PE-AC/Ag^0 demonstrated high catalytic efficiency over a 6 cm^2 surface area, achieving reaction rates that exceeded or matched those documented for other silver-based catalysts. Moreover, PE-AC/Ag^0 showed exceptional stability, maintaining its catalytic activity consistently across multiple cycles with no significant performance decline. This stability, combined with the high catalytic activity, makes PE-AC/Ag^0 a promising candidate for chemical processes demanding durable catalysts with prolonged operational lifespan. In conclusion, PE-AC/Ag^0 presents a viable alternative for heterogeneous catalysis, potentially contributing to more sustainable catalytic applications and processes.

Keywords – 4-nitrophenol; 4-aminophenol; Activated Carbon; Polyester fabric, reduction deposition

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Optimized Sequential Treatment of Tannery Wastewater Using Aeration and UV/US/PS/H_2O_2: Performance and Phytotoxicity Assessment

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Abstract – This study investigates an integrated treatment approach for tannery wastewater (TWW) from Fez City, employing aeration as a pretreatment step followed by an advanced oxidation process (AOP) using a binary system of hydrogen peroxide (H_2O_2) and persulfate ($S_2O_8^{2-}$) as oxidants. Ultraviolet-A (UV-A) irradiation and ultrasound (US) were applied as activation methods (H_2O_2-PS-US-UV-A). Aeration pretreatment achieved chemical oxygen demand (COD) and color removal efficiencies of 71% and 78%, respectively. The AOP was optimized using the Box-Behnken Design (BBD) to assess the effects of key operating parameters (pH, [$S_2O_8^{2-}$], and [H_2O_2]) on COD and color removal. Statistical and graphical analyses demonstrated that the sequential treatment, combining aeration with the H_2O_2-PS-US-UV-A system, achieved maximum COD and color removal efficiencies of 85% and 93%, respectively, under optimal conditions: [H_2O_2] = 225 mg/L, [$S_2O_8^{2-}$] = 3670 mg/L, and pH = 3.

Phytotoxicity evaluation was performed using bioindicators *Medicago sativa* (alfalfa) and wheat through germination and seedling vigor index assessments. The combined treatment significantly reduced phytotoxicity compared to untreated wastewater. Remarkably, the treated tannery effluent not only exhibited high pollutant removal efficiency but also met environmental standards for potential reuse in industrial applications or agricultural irrigation.

Keywords – Tannery wastewater; Aeration; Advanced Oxidation Processes; Box-Behnken Design; Ultrasound; Ultraviolet-A Irradiation; Phytotoxicity.

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Valorization of incinerated sewage sludge in the manufacture of clay bricks

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Abstract : Incinerated sewage sludge is solid residue from wastewater treatment in sewage treatment plants, which has then been subjected to high-temperature incineration, generally between 850 and 1000°C. This combustion reduces their volume while destroying organic and pathogenic substances. The main mineral components found in these ashes are silica, alumina, lime and iron oxides.

Clay brick is a traditional building material that has been used for thousands of years. It is widely used due to its strength and ability to regulate temperature, providing good thermal insulation in buildings. However, the manufacture of this material requires large quantities of clay, a non-renewable natural resource, the extraction of which can have significant environmental impacts.

Incinerated sewage sludge represents an interesting alternative to clay in the manufacture of clay bricks. Coming from wastewater treatment, this sludge, once incinerated, generates ash rich in mineral matter. Their partial incorporation into the basic mixture not only reduces the quantity of clay extracted, but also recovers industrial waste that would otherwise be landfilled. This substitution helps reduce the environmental impact of brick manufacturing, while retaining mechanical and thermal properties adapted to construction requirements. In addition, this approach is part of a circular economy logic, promoting sustainability and responsible resource management.

Keywords – sewage sludge, bricks, terracotta, recovery.

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ON THE FRACTIONAL HYBRID STURM-LIOUVILLE AND LANGEVIN DIFFERENTIAL EQUATIONS AND INCLUSIONS IN THE FRAME OF ψ-HILFER OPERATOR

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Abstract – In this investigation, we explore the existence and uniqueness of solutions for fractional hybrid differential equations and inclusions of Langevin and Sturm-Liouville within the sense of the ψ–Hilfer fractional derivatives. We characterize an unused operator based on the integral solution of the given boundary value inclusion problem, and after that we utilize the presumptions of Dhage's fixed point for the operator within the hybrid case. The theorem is connected for the boundary value problem in the single-valued case uniqueness of solution which is decided by utilizing Banach's contraction mapping rule. Moreover, the stability analysis within the Ulam-Hyers sense of a given system is considered. At last, illustrations are advertised to guarantee the legitimacy of our obtained results.

Keywords – Inclusion; ψ–Hilfer fractional derivative; existence and uniqueness; nonlinear analysis; Ulam stability

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2-[(2,4-Dimethoxybenzylidene)-hydrazono 1,2-diphenyl-ethanone] derivative: Synthesis, Structural Analysis, Molecular Docking and Molecular Dynamic Simulations

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Abstract – A new organic compound, 2-[(2,4-Dimethoxybenzylidene)-hydrazono 1,2-diphenyl-ethanone] (DBHDE), has been synthesized for the first time, and its structural characterization has been carried out using the X-ray diffraction method. The compound DBHDE crystallizes in the P 2_1/c space group with Z=8 in the unit cell. It belongs to the monoclinic system with the following linear and angular dimensions: a=28.597(3) Å, b=8.2842(5) Å, c=17.8628(15) Å, and β=107.925(6) °. To support the experimental results, density functional theory (DFT) calculations were performed using the B3LYP functional with a 6-311G (d, p) basis set. All the theoretical results obtained are in perfect agreement with the experimental results. In addition, molecular docking was applied, the results showed that the DBHDE compound has significant potential as an effective inhibitor in the treatment of cancer. The MD simulation analysis verifies the structural stability of the selected complex during 100 ns of simulation.

Keywords – DBHDE, X-ray, DFT, Molecular Docking, MDS.

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HİBRİT YÖNTEMLER İLE YÜKSEK PERFORMANSLI BATARYA TAŞIYICISININ GELİŞTİRİLMESİ

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Özet – Hafifletme, taşımacılık sektöründe özellikle dikkat çeken ve verimliliği doğrudan etkileyen bir faktördür. Bu nedenle maliyetler üzerinde önemli bir etkiye sahiptir. Elektrikli araç çalışmalarında, özellikle çarpışma sırasında bataryayı çevreleyen gövdenin darbeyi en iyi şekilde absorbe etmesi gerekir. Batarya bölmelerinin sağlam bir şekilde korunması ve çarpışma durumlarındaki risklerin en aza indirilmesi gibi karşı önlemler alınmaktadır. Bu çalışma, M1 kategorisindeki bir aracın batarya kutusundaki yan profillerin çarpışma performansını iyileştirmeyi amaçlamaktadır. ECE R100 yönetmeliği Ek 8D'de yer alan çarpışma testi temel alınmıştır. Çalışmada bataryanın deforme olmayacağı güvenli yer değiştirme 20 mm olarak belirlenmiş ve bu yer değiştirmedeki maksimum kuvvet ve enerji emilimi karşılaştırılmıştır. Çalışmada toplam 33 farklı elektrikli ve hibrit araç modeli kıyaslanmıştır. Genel olarak L şeklindeki geometrinin ve alüminyum malzemenin tercih edildiği belirlenmiştir. Çalışmada bataryaların çarpışma durumlarında daha dayanıklı ve hafif olması için fiberglas malzemeden yapılmış bir destek profili kullanılmasına odaklanılmıştır. Alüminyum yerine pultrüzyon tekniği ile üretilen Cam Elyaf Takviyeli Polimer (GFRP) malzeme kullanılmıştır. Mekanik özellikler için kapsamlı bir araştırmaya dayanarak, sayısal ve deneysel olarak doğrulandığı ve cam elyaf takviyeli kompozitler arasında mevcut duruma en yakın mekanik dayanıma sahip olduğu için GF800 malzemesi seçilmiştir. Seçilen malzeme ile fiziksel çekme testi için bir korelasyon çalışması gibi sanal bir çekme testi modeli oluşturulmuş ve malzeme doğrulanmıştır. Bal peteği ve auxetic geometrileri birleştirilerek benzersiz bir hibrit model oluşturulmuştur. Toplam 27 model oluşturulmuş ve 3 tasarım değişkeni belirlenerek farklı kombinasyonlarda analiz edilmiştir. Bu analizin çıktıları yapay sinir ağı (YSA) yöntemi kullanılarak çok amaçlı optimizasyon yöntemi ile optimize edilmiş ve sonuçlar doğrulanarak en iyi sonucun parametreleri ile tekrar modelleme ve analiz yapılarak optimum tasarım belirlenmiştir. Bu çalışmada elektrikli araçlarda kullanılan bataryalardaki taşıyıcının yan profili optimize edilmiş ve profil başına 1,8 kg azalma sağlanmıştır.

Anahtar Kelimeler – Cam Elyaf Takviyeli Polimer, Hibrit yapı, Pil taşıyıcı, Çarpışma testi, Pultrüzyon, Yapay Sinir Ağı

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Update of the floristic list of the Belezma National Park (Biosphere Reserve)

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Abstract **-** The objective of the study is to provide an Update of the floristic list of the Belezma National Park (Biosphere Reserve).

This study was conducted in the Belezma National Park in the wilaya of Batna. The Belezma National Park, created by Decree 84-326 of November 3, 1984, is characterized by the presence of large expanses of Atlas cedar in an area of great Mediterranean and Saharan influences. The park is in the BELEZMA mountain massif, which is located at the western end of the Aurès mountains, about 7 km northwest of the city of Batna. is in the eastern part of northern Algeria) from the end of March to the end of June 2021, 2022 and 2023, and due to the lack of recent studies on the park, we have done this work to confirm the above and research what is new, and we use a working method: method of systematic sampling.
In order to carry out this work, we need the following materials: a digital camera, maps, identification guide, GPS, harvest log, press.
The results obtained showed that our field trip was based on the collection of all the species present in the stations visited, and with an average of 36 field trips and 18 stations visited; we collected 285 identified species from different families. The realization of a floristic catalog.
We have inventoried the following species; *Seseli atlanticum* Boiss, *Pimpinella lutea* Desf, *Ferula communis* L., *Eryngium campestre* L., *Torilis nodosa* L. Geartn, *Bunium atlanticum* (Maire) Dobignard, *Daucus carota L., Muscari neglectum* Guss.ex ten , *Catananche montana* Coss.& Durieu
, *Lomelosia stellata* (L.) Raf, *Sinapis arvensis subsp.arvensis* , *Helianthemum ruficomum* (Viv) Spreng , *Helianthemum cinereum* (Cav.)Pers , *Convolvulus althaeoides* L.

Key word: floristic inventory, Update, Belezma National Park, floristic inventory

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Contribution to the evolution of heat waves in the Constantine region

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Abstract **-** The regression from year to year of the vegetation cover of arid and semi-arid zones, which represent a third of the surface of the globe, is alarming.

The phenomenon of climate change is considered one of the most serious threats posed to the planet's environment, with negative effects on the survival of plants; however, the range of several species is likely to shrink more and more.

In this presentation, we plan to study climatic and more precisely thermal changes in semi-arid environments and their impact on plants, and to focus on the damage caused to it by the extreme temperatures recorded during the last ten years (1997- 2007).

We compare between the first years 1998-1999, when we recorded the lowest temperatures (-13°C) compared to what we observe today.

We propose to calculate and analyze the number and duration of heat waves. According to our results, we can say that among 10 years, four years have experienced heat waves with exceptional intensities, with a clear seasonal variation more particularly between the hot and cold seasons, which allows us to assume that heat waves will be more frequent in the future.

The hottest summer was that of 1999, followed by the year 2003, the coldest was that of 2001, so we can see that warming has thus accelerated considerably to reach alarming increases per decade at the annual and seasonal levels, more particularly during the summer season over a period of 30 years.

The analysis of the three-hour thermal data from the Constantine station shows a clear variation seasonal more particularly between the hot and cold seasons.

Keywords: Thermal variation, Heat waves, Three-hour thermal data, Constantine, Semi-arid climate

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Autonomous Ships and Emission Reduction: A Future Outlook

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Abstract – The maritime industry is striving to achieve net-zero emissions in line with global environmental goals and the International Maritime Organisation's updated targets. Autonomous vessels, which utilise advanced technologies such as artificial intelligence, IoT and real-time data analytics, offer a transformative approach to reducing greenhouse gas emissions while improving operational efficiency. These ships optimise fuel consumption through precise route planning, weather forecasting and automated operations, significantly reducing emissions. Their integration with alternative propulsion systems, such as hydrogen fuel cells and electric motors, further supports net-zero goals by reducing reliance on fossil fuels. In addition, autonomous operations minimise human error, reduce port waiting times and streamline logistics, resulting in less energy waste. Despite their potential, several challenges are holding back widespread adoption. The lack of a comprehensive regulatory framework, high initial investment costs, and concerns about cybersecurity and emergency protocols are significant barriers. Addressing these issues is critical to realising the full environmental and operational benefits of autonomous ships. As the technology continues to evolve, autonomous ships have the potential to play a pivotal role in transforming the maritime sector into a greener and more sustainable industry. This study examines the capabilities, benefits and challenges of autonomous ships, highlighting their importance in achieving net-zero emissions and their potential to revolutionise global maritime logistics.

Keywords – Autonomous Ships, Emission Reduction, Net-zero Target, Maritime Transportation

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Dust accumulation and its impact on the efficiency of a photovoltaic module

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Abstract – The accumulation of dust on a photovoltaic panel has a considerable effect on its performance. This results in a reduction in the panel's electrical efficiency. This phenomenon impedes the transmission of solar rays through the various layers of the module, thereby limiting their access to the photovoltaic layer. Consequently, some incident photons are scattered, resulting in an elevated temperature for the system components. Furthermore, this rise in temperature contributes considerably to energy losses and the reduction in efficiency and yield of photovoltaic cells.

The study began with an analysis of the impact of the accumulation of specific types of dust, in order to gain a deeper understanding of the effects of shading and the deposition of various particles on the glass surface of the panel. Subsequently, a computer simulation was conducted to enhance comprehension of the phenomenon by corroborating the findings with those documented on the GUNT-ET250, experimental module at the laboratory.
Finally, a discussion after adequate surface characterization of the dust particles studied (fly ash, wood debris, and sand grains) to highlight the results collected and the explanations thus devised.

Keywords – Soiling, dust deposits, Effect of dust, Photovoltaic performance, Photovoltaic cell Shading effect, Modulation, 2D heat transfer.

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Influence of the suppressıon of the corner column on the compressıve stresses of l-shaped rc shear walls

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Abstract – Designing innovative, economical, and earthquake-resistant structures is a major concern for civil engineers. In this article, a comparison is made between the performance of columns in L-shaped shear walls in three different buildings subjected to a strong earthquake. Additionally, shear walls with centered openings of different sizes were also studied. The impact of column removal and opening size on compressive stresses was examined. The results revealed that the influence of column removal from the L-shaped shear wall on the compressive stress response during a high earthquake was relatively minor for the four-story building. However, the influence was significant for the seven- and eleven-story buildings, which were affected by the shear wall thickness and the percentage of opening. Specifically, when the eleven-story buildings are braced with 15-cm thick walls, the compressive stress difference reaches a value of 5.40 MPa. This stress difference becomes noticeable at an opening percentage of 30%.

Keywords – Buildings; RC Shear Walls; Openings; Column Suppression; Compressive Stresses.

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Separation processes in mineral and agriculture processing of materials

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Abstract – Separation or grading of commodities is widely used in mineral as well as agriculture processing. Separation processes are mostly based on difference in physical properties of the materials involved. There are many physical properties of materials which are helpful during the separation processes such as size, mass, density, and colour. Separation processes help to improve upon the recovery of desired material components from among the mixture of a variety of materials in terms of amount of the recovered material as well as the time taken to separate out the materials. Several technological developments have taken place in mining industries for mineral materials separation due to huge amounts of minerals and their high costs involved. However, the separation processes in agricultural sector have not been investigated as thoroughly. Spiral separator is used in mining as well as agricultural industries for separating the desired target materials from unwanted materials such as impurities. Spiral separator makes use of the centrifugal force effect to separate out the materials based on their mass densities. Rubbing of materials on surface of spiral separator produces excessive noise. Design and fabrication of spiral separator plays an important role in deciding its efficient and silent working. Review of existing literature shows that there is need for designing and fabricating special purpose separators for agricultural applications which can help in faster and silent separation processes for a variety of sizes, shapes, and densities of agricultural commodities.

Keywords – Agriculture, Materials, Mineral, Separation Processes, Spiral Separator

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Synthesis and chemical characterization of calcium fluorohydroxyapatite

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Abstract – Biomaterials are developed to maintain the integrity and comfort of life for people with severe functional impairments. There is increasing interest in the use of bioactive bioceramics in the medical field due to their property of creating biological links with the natural bone structure. Hydroxyapatite (HA) is known for its bioactive properties for bone filling. However, fluorohydroxyapatite has a proven track record in oral health, with fluorine being an essential trace element for the prevention of tooth decay and the mineralisation of dental enamel. The aim of this study is to develop pure hydroxyapatite (HA) at different temperatures and subsequently add fluorine to obtain fluorohydroxyapatite (FHA). In this work hydroxyapatite (HA) and fluorohydroxyapatite (FHA) are prepared by the precipitation method. The hydroxyapatite is doped with 25% fluorine. The powders obtained are calcined for 1 hour at different temperatures: 300°C, 500°C, 700°C and 1000°C. The characterisation of hydroxyapatite (HA) and fluorohydroxyapatite (FHA) was carried out by Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD) and thermogravimetric analysis coupled to differential scanning calorimetry (TGA/DSC). The results obtained confirm the formation of hydroxyapatite and fluorohydroxyapatite by precipitation and its stability after heat treatment. Pure hydroxyapatite powders could be produced. The powders obtained after calcination at different temperatures were not altered by temperature, the fluorine added in the fluorohydroxyapatite is present after heat treatment up to 1000°C.

Keywords – Biomaterials; hydroxyapatite; fluor; DRX; bio-ceramics

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Nonlinear oscillations and wave propagation in ultra-cold gases

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Abstract – We investigated hybrid modes and traveling wave propagation in an ultracold atomic gas. Using a fluid plasma description model, we treat the nonlinear oscillation modes of a cloud of ultra-cold atoms confined in a magneto-optical trap. The effect of repulsive forces between nearby atoms and the viscosity of the media are discussed, through the key parameter z_{eff} q_{eff} which ranges from 10^{-5}e to 10^{-3}e and the friction parameter α. The gas is treated as an effective single-species plasma. We focused on wave propagation dynamics, considering thermal pressure, effective Coulomb interaction and damping effects. A small amplitude wave analysis revealed the existence of nonlinear plasma- like oscillations governed by the effective charge number z_{eff}.

Keywords – Ultra-Cold Gas, Magneto-Optical Trap (MOT), Hybrid Modes, Nonlinear Oscillations, Fluid Analysis

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Advancing Sustainable Infrastructure: The Synergy of Self-Healing Materials and Sewage Sludge Ash in Construction

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Abstract – This review delves into the intersection of self-healing materials and sewage sludge ash (SSA) as a transformative approach in sustainable construction. Self-healing materials offer the ability to autonomously repair cracks, significantly enhancing structural lifespan and reducing maintenance efforts. Meanwhile, SSA, a by-product of wastewater treatment processes, provides an eco-friendly alternative to conventional cement and fine aggregates, addressing environmental concerns by recycling waste and reducing carbon emissions.

Through a comprehensive evaluation of recent research, this review explores the combined application of these innovative materials, assessing their impact on mechanical properties, durability, and environmental sustainability. Key findings highlight the potential of SSA to improve the microstructure and performance of self-healing concrete, while the integration of advanced repair mechanisms ensures prolonged functionality and resilience under environmental stressors.

The review also identifies existing challenges, including the optimization of SSA processing methods and the compatibility of self-healing technologies with alternative binders. By summarizing state-of-the-art developments and proposing future research directions, this study underscores the potential of combining SSA and self-healing materials to revolutionize construction practices, promoting the development of resilient, low-carbon infrastructure.

Keywords – Self-healing materials, sewage sludge ash, sustainable construction, waste recycling, Review.

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Primal-dual interior-point algorithm for convex quadratic programming based on a new type of parameterized kernel function

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Abstract – This paper presents a primal-dual interior-point algorithm for convex quadratic optimization based on a parametric kernel function. The proposed parametric kernel function has excellent properties that can be used both for determining the search directions and measuring the distance between the given iterate and the central path for the algorithm. We establish that this algorithm correlates with the best-known iteration bound for large-update methods, namely, ¨O $\left(\sqrt{n}log\ n\ log\frac{n}{\varepsilon}\right)$¨ by a special choice of the parameter *a*. Finally, we present some numerical results to show the practical behavior of the new proposed kernel function.

Keywords – Convex quadratic programming, kernel function, interior-point methods, iteration bounds.

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Hydrogels Based on Sodium Alginate and NIPAAm for Swelling and Thermal Properties

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Abstract **–**Hydrogels have become essential materials for biomedical and environmental applications due to their stimuli-responsive properties. This study focuses on the preparation of thermosensitive hydrogels using sodium alginate and N-isopropylacrylamide (NIPAAm) at varying concentrations. These hydrogels were synthesized to optimize their mechanical and swelling properties under different pH and temperature conditions. Characterization was performed using Fourier Transform Infrared Spectroscopy (FTIR) to confirm the chemical structure and Thermogravimetric Analysis (TGA) to assess thermal stability. The swelling behavior revealed that the hydrogels exhibited dual sensitivity to both temperature and pH, making them suitable for applications such as controlled drug release and wound healing. By tailoring the concentrations of alginate and NIPAAm, the hydrogels showed promising results in terms of responsiveness and durability. This study provides a simple and effective approach to designing smart hydrogels with potential applications in advanced drug delivery systems and biomedical engineering.

Keywords – Hydrogels, Sodium Alginate, NIPAAm, Thermosensitivity, Polymer Networks

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Optimizing Concrete Performance with Quarry Sand: A Sustainable Approach to Construction Materials

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Abstract **–** This research explores the potential of quarry sand as an eco-friendly alternative in sand concrete production, emphasizing both performance and sustainability. Concrete specimens were formulated with varying quarry sand content to assess its influence on mechanical properties and durability. Tests conducted included flexural strength, compressive strength, and ultrasonic pulse velocity. These results underscore the feasibility of quarry sand as a sustainable, partial substitute for river sand, contributing to resource conservation and environmentally conscious construction practices.

Keywords – Sustainable, sand, flexural strength, compressive strength and ultrasonic pulse velocity

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Spinal Tümörler İle Oksidatif Stres Arasındaki İlişki Nedir?

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Özet - Omurga, hayati organların desteklenmesine yardımcı olan aksiyel iskeletin önemli bir kısmını oluşturur. Metastatik tümörler, omurgayı etkileyen en yaygın tümörler arasında yer almaktadır. Sıklık bakımından, iyi huylu kemik tümörleri metastatik tümörleri izler ve omurgayı etkileyen primer kemik sarkomları en nadir görülen tümörlerdir. Omurgadaki primer tümörleri metastatik tümörlerden ayırmak bazen zor olabilir. Omurga tümörleri, sırt ağrısı ve diğer semptomlardan sadece küçük bir yüzdeyle ilişkilidir. Omurga ile ilişkili tümörler genellikle iç organ kanserlerinin yaşlı hastalardaki yayılımı olarak ortaya çıkar. Omurgayı ilgilendiren temel kas-iskelet sistemi sarkomları genellikle nadir rastlanan durumlardır. Kas-iskelet sistemi üzerindeki iyi huylu tümörler ve tümör benzeri lezyonlar genellikle genç bireylerde görülür ve sıkça instabilite ile kanal bozulmasına yol açabilir. Omurga tümörlerinin en iyi şekilde tanı ve tedavisi için, farklı disiplinlerden uzmanların işbirliğiyle hem omurga cerrahisi hem de kas-iskelet tümörü cerrahisi konularında kapsamlı bilgiye ihtiyaç duyulmaktadır. Omurgayı etkileyen başlangıç veya yayılmış tümörler, tanı ve tedavi bakımından karşılaşılan zorluklar arasında yer almaktadır. Omurga tümörü bulunan hastalardaki temel ve hayati problemler omurga instabilitesi ve nörolojik bozulmadır. Daha önce, primer ve metastatik omurga tümörlerinin tedavisi için yalnızca kısa süreli kontrolü amaçlayan birkaç tedavi seçeneği bulunmaktaydı. Omurga cerrahları, son 20 yılda omurga tümörlerine karşı yaklaşımlarını ortopedik onkolojik prensiplere uygun şekilde düzenlediler. Görüntüleme teknolojilerindeki ilerlemeler ve cerrahi yöntemler ile implant teknolojisinin gelişimi, özellikle birincil tümörlerin daha iyi teşhis edilmesi ve cerrahi tedavi seçeneklerine yol açtı. Ayrıca, modern kemoterapi ilaçları ve rejimleri, omurga ile ilişkili birincil sarkomlar da dahil olmak üzere, yeni radyoterapi ve radyocerrahi seçenekleriyle sağlam bir orta ila uzun vadeli lokal ve sistemik kontrol sunmaktadır. Son yıllarda yapılan araştırmalar, oksidatif stres ile kanser arasındaki ilişkiye odaklanmaktadır. Oksidatif stres, vücutta serbest radikaller ile antioksidan savunma mekanizmalarının dengesizliğinden meydana gelir. Bu çalışmada spinal tümörler ile oksidatif stres arasındaki ilişki incelendi. Bu çalışma sonucunda spinal tümörlerin önlenmesine yardımcı olabilecek yeterli antioksidan içeren gıdaların tüketilmesinin faydalı olabileceği sonucuna varıldı.

Anahtar Kelimeler : Omurga, Sarkom ,Spinal Tümörler, Oksidatifstres, Antioksidant, Metastaz, Omurga neoplazmaları, Palyatif cerrahi

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Design and Simulation of a Solar-Powered EV Charging Station: A MATLAB Study on Optimal Power Conversion and Grid Integration

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Abstract **–** This paper explores the design and simulation of a solar-powered electric vehicle (EV) charging station, with a focus on optimizing power conversion efficiency and ensuring reliable grid integration. Using MATLAB and Simulink, comprehensive models were developed to simulate the interactions between the solar photovoltaic (PV) array, power converters, battery storage, and the EV charging infrastructure. The study examines the performance of the charging station under different solar irradiance conditions, while considering factors such as time-of-day variability, seasonal changes, and energy storage capacity. Key objectives include maximizing solar energy utilization, minimizing grid dependency, and ensuring stable power delivery to EVs during peak demand periods. The research investigates various power conversion strategies and control algorithms to optimize the flow of energy between the PV system, battery storage, and EVs, while minimizing losses and maintaining power quality. Additionally, the impact of system size, energy storage, and charging station demand on overall performance is assessed. The results provide valuable insights into the potential of integrating solar energy into EV charging infrastructure, supporting the transition to clean transportation and contributing to the development of sustainable, energy-efficient charging solutions.

Keywords – Power Conversion, Solar Energy, Charging Infrastructure, Battery Storage, Power Flow

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YANGIN VE AFET YÖNETMELİKLERİNE GÖRE BİR KAMU HASTANESİNİN İNCELENMESİ

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Özet **–** Hastanelerde yangın ve afete karşı nasıl hazırlıklı olunacağı ilgili kanun ve mevzuatlarda bildirilmektedir. Buna göre hastanelerin mevcut incelenmeli, olumlu-olumsuz sonuçları ortaya konulmalıdır. Ancak literatür taraması yapıldığında bu hususta yeterli araştırma örnekleri görülememektedir. Literatürde tespit edilen bu boşluğun doldurulması ve bir ilçe devlet hastanesindeki durumun söz konusu kanun ve yönetmelikler çerçevesinde incelenmesi bu çalışmamızda gerçekleştirilmiştir. Bu sorunun bir cevabı olması için bir kamu hastanesi tüm birimleri ile incelenerek ilgili mevzuatlara uygunluğu araştırılmıştır. Çıkan olumlu ve olumsuz sonuçlar ile çözüm önerileri çalışma sonucunda sunulmuştur. Hastaneler kesintisiz hizmet vermesi gereken birimlerdir. Özellikle birçok ilin deprem kuşağında olması nedeniyle, Türkiye'deki hastanelerin yangın ve afet durumlarına hazırlıklı olması, hizmetin kesintiye uğramaması adına büyük önem arz etmektedir.

Anahtar Kelimeler – Kamu, hastane, yangına hazırlık, afete hazırlık, uygunluk

Bu çalışma, Kütahya Sağlık Bilimleri Üniversitesi, Lisansüstü Eğitisim Enstitüsü Dr. Öğr. Üyesi İ. Serden Başak'ın danışmanlığında Necmi Hakan Karahan tarafından yürütülen "Bir Kamu Hastanesinin Yangin Ve Afet Yönetmeliğine Göre İncelenmesi" adlı tezsiz yüksek lisans projesinden üretilmiştir.

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Psychological Barriers to Reporting Unsafe Practices in Maritime Operations

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Abstract **–**The reporting of unsafe practices is a critical component of maritime safety management, serving as a foundation for identifying risks and preventing incidents. Despite its importance, many seafarers face psychological barriers that hinder effective reporting. These barriers are often rooted in fear of retaliation, feelings of shame, perceived futility of the reporting process, and deeply ingrained cultural norms within the maritime industry. Additionally, a lack of trust in organizational leadership and ineffective feedback mechanisms further discourage individuals from raising concerns about unsafe practices. This paper examines the psychological dynamics that impede seafarers from reporting unsafe practices and their broader implications for maritime operational safety. Drawing on insights from psychology, organizational behavior, and maritime safety literature, this study highlights how these barriers compromise the effectiveness of safety management systems. Moreover, it explores the interplay between individual factors, such as personal fear and workplace relationships, and systemic issues, including cultural attitudes and organizational policies. To address these challenges, the study proposes actionable strategies to foster a strong safety reporting culture. Key recommendations include implementing anonymous reporting mechanisms, training leadership to build trust and open communication, and promoting a blame-free culture through clear policies and education. By creating a supportive and transparent environment, maritime organizations can empower seafarers to report unsafe practices without fear, significantly enhancing safety outcomes and operational resilience.

Keywords – Maritime Safety, Reporting Barriers, Seafarer Psychology, Safety Culture, Human Factors

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First principles study of design structural analysis and charge transfer phenomenon in ZrV_2O_7/Graphene and $ZrTi_2O_6$/Graphene heterojunctions

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Abstract – Titanates and vanadates are two classes of transition metal oxides that have garnered significant attention in recent years due to their exceptional electronic, optical, and photocatalytic properties. These compounds held considerable potential for addressing key challenges in biomedical applications, environmental sustainability, and energy production. This research project aimed to design heterojunctions between ZrV_2O_7/Graphene and $ZrTi_2O_6$/Graphene. The properties studied included geometry optimization, electronic properties (such as band structure, density of states (DOS), and projected density of states (PDOS)), optical properties, and thermodynamic properties. These parameters were calculated using the DS BIOVIA Material Studio software. The modules and functionals employed in this study were CASTEP for geometry optimization and GGA-PBE and HSE06 for electronic structure calculations. Initial results were obtained using the GGA-PBE functional and later validated with HSE06. This work aimed to advance the field of photocatalytic degradation and contribute to experimental efforts focused on the ZrV_2O_7/Graphene and $ZrTi_2O_6$/Graphene heterojunctions.

Keywords – First principles study, Charge transfer phenomenon, Vanadium-based materials, Heterostructure, Computational material science

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Sağlık Alanında Kullanılan Nanomalzemeler, Riskleri ve Korunma Yöntemleri

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Özet **–**Maddelerin nano boyutlara küçültülmesi ve spesifik özelliklerin kazandırılması nanoteknolojik çalışmalarla mümkün hale gelmiştir. Son dönemlerde nanoteknolojik çalışmalar ile üretilen nanomalzemeler birçok sektörde kullanımı yaygınlaşmıştır. Sağlık sektöründe de nanomalzemeler yaygın olarak kullanılmaktadır. Sağlık alanında hastalıkların tanısında, tedavisinde ve ilaç geliştirme faaliyetlerinde nanomalzemelerin kullanımı hız kazanmıştır. Nanomalzemeler, hastalıkların teşhis ve tedavisinde yeni çözümler sunmaktadır. Nanomalzemeler hastalar için yararlı olsa da sağlık çalışanlarının sağlığı üzerinde olumsuz etkilere neden olabilmektedir. Bu çalışmada sağlık alanında kullanılan nanomalzemeler, nanomalzemelere maruz kalan sağlık çalışanlarını tehdit eden sağlık riskleri ve bu risklere yönelik korunma yöntemleri incelenmiştir. Sağlık çalışanları iş gereği nanomalzemelere maruz kalmaktadırlar. Bu yüzden oluşabilecek sağlık sorunlarına karşı yüksek riskli grupta yer almaktadırlar. Nanomalzemeler solunum yoluyla, sindirim yoluyla ve deri yoluyla insan vücuduna nüfuz edebilmektedir. Sonuç olarak nanomalzemelere maruziyet akciğer hastalıklarına, kalp hastalıklarına, nörolojik hastalıklara, cilt hastalıklarına ve çeşitli kanserlere zemin hazırlayabilmektedir. Nanomalzemelere yönelik alınabilecek korunma yöntemleri olan güvenlik bilgi formlarının oluşturulması, teknik önlemlerin alınması, kişisel koruyucu ekipmanların kullanılması ve gerekli mühendislik kontrollerinin yapılmasıyla potansiyel sağlık risklerine karşı koruyuculuk sağlamaktadır.

Anahtar Kelimeler – Nanomalzemeler, sağlık sektörü, potansiyel riskler, korunma yöntemleri

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CHARACTERIZATIONS OF PURE AND Ce-DOPED Al_2O_3 AEROGELS NANOSTRUCTURES ELABORATED BY A MODIFIED SOL GEL PROCESS

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Abstract – The present study is based on the elaboration and characterization of pure and cerium (0.5%, 2%) doped alumina aerogels by sol-gel process followed by supercritical drying in isopropanol. The aerogels were thermally annealed at 1150°C for a period of 2 hours.
The resulting powders were then analysed by X-ray diffraction (XRD) and Fourier transform infrared (FT-IR) spectroscopy.
XRD confirmed the formation of α-Al2O3 with a rhombohedral structure and Fourier transform infrared spectroscopy (FT-IR) confirmed the formation of Al2O3 through the presence of AlO and Al-O-Al bonds.

Keywords : Al_2O_3 , Ce, sol-gel, AlO and Al-O-Al.

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Dorse Amortisörlerinde Kaynak Dikiş Uzunluğunun Dayanıma Etkisi

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Özet – Ağır vasıta araçlarda kullanılan dorse amortisörleri, yoldan gelen titreşimleri sönümleyerek yük güvenliğini sağlama, süspansiyon hareketlerini kontrol etme ve yol tutuşunu artırma gibi kritik görevlere sahip komponentlerdir. Bu ürünlerin dayanımı ve yorulma performansları, birleştirme aşamasında kullanılan kaynak tekniği ve kalitesi ile doğrudan ilişkilidir. Bu çalışmada, dorse amortisörlerinde kullanılan kaynak dikiş boyunun mekanik dayanım üzerindeki etkisi deneysel yöntemlerle incelenmiştir. Öncelikle amortisör üzerinde gerçekleştirilen statik analiz ile maksimum gerilmelerin oluştuğu bölgeler tespit edilmiş, sonrasında bu bölgede yer alan kaynak dikişinin farklı boyları için mekanik testler gerçekleştirilerek uzama ve kopma değerleri tespit edilmiştir. Yapılan çalışma sonucunda bu tip amortisörlerde kaynak dikiş uzunluğunun belirli bir değerin altında kaldığı durumlarda yüzük kısmında, kaynak bölgesi ve çevresinde hasar oluştuğu görülmüştür. Bu yapılan çalışmada kaynak dikiş uzunluğunun amortisörün dayanımı üzerinde önemli bir etkisi olduğu tespit edilmiştir.

Anahtar Kelimeler – Dorse amortisörü, gazaltı kaynağı, kaynak dikiş uzunluğu, sonlu elemanlar analizi

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Investigation and Advancement of Darrieus Vertical Axis Wind Turbines.

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Abstract – The vertical axis turbine, commonly known as a wind turbine, is a device that converts the kinetic energy of the wind into electricity. There are mainly four types of wind turbines: the vertical axis turbine designed by Darrieus, the turbine developed by Savonius, the hybrid turbine, and the lift-type turbine.

In our study, we deepened our knowledge of aerodynamics and conducted a numerical study on a two-blade wind turbine. We used meshing to create a 2D cross-sectional model, allowing us to analyze airflow and the forces at play. After performing a numerical simulation, we compared our results with those of Lanville's study, revealing a significant agreement that reinforced the credibility of our approach.

We also considered designing a wind turbine with four enlarged profiles based on our experience with the two-profile model. This new design aimed to optimize wind capture and improve overall efficiency. Finally, we conducted a detailed comparison of the performance of the two configurations. This approach helped us better understand the practical implications of each design, identify areas for improvement, and propose concrete recommendations for future developments in wind energy technologies. This ultimately contributes to the advancement of more sustainable and renewable energy, essential for the global energy transition.

Keywords – Aerodynamics, Vertical Axis Wind Turbine (VAWT), Darrieus Wind Turbine, Wind Energy

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The Impact of Foreign Direct Investment on Economic Growth in Algeria

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Abstract – The purpose of this study is to assess the effect of Foreign Direct Investment (FDI) on the Algerian economy through an empirical analysis using the ARDL bounds testing approach and ECM-ARDL model. The study employs annual data from 1990 to 2022 to investigate the long-term relationship between FDI and economic growth in Algeria. The bounds-testing approach to cointegration, originally introduced by Pesaran & Shin (1999) and further extended by Pesaran et al. (2001), is used to test the existence of a cointegrating relationship between FDI and GDP. The empirical findings suggest that FDI has a positive and significant impact on Algeria's economic growth over the long term. Specifically, the results indicate that a one-unit increase in FDI leads to a 1.67% increase in GDP, highlighting FDI's potential as a key driver of economic development. Furthermore, the study demonstrates that FDI contributes to enhancing the overall economic performance of Algeria by stimulating production, creating job opportunities, and improving technological transfer. These findings provide valuable insights into the role of FDI in fostering economic growth and suggest that policies aimed at attracting more FDI could further accelerate Algeria's economic development.

Keywords – Algerian Economy, FDI, ARDL Model, GDP, Economic Growth

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The Importance of Renewable Energy in Achieving Sustainable Development

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Abstract – In recent years, global crises and the resulting increase in energy prices have raised concerns among several countries regarding their ability to achieve energy security. These concerns are further amplified by persistent fears about the sustainability of traditional energy sources and their capacity to ensure reliable energy supplies for future generations. Consequently, many countries have shifted toward diversifying their energy sources, focusing on renewable energy, which represents a strategic dimension in achieving sustainable development across its economic, social, and environmental facets.

Renewable energy, as a branch of engineering, is dedicated to generating power from sustainable natural resources such as wind, solar, and marine energy. In response to the growing global climate challenges, renewable energy engineers play a pivotal role in identifying environmentally friendly energy sources that are both sustainable and ecologically compatible.

This research paper aims to highlight the significance of renewable energy in achieving sustainable development and to elaborate on the various types of sources used for energy generation, employing a descriptive-analytical approach. Among the key findings is that, despite certain limitations associated with renewable energy sources, they remain one of the most crucial solutions for ensuring sustainable development across all sectors—whether economic, social, or environmental.

Keywords **:***Renewable energy, sustainable development, energy generation sources, energy prices, environment.*

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Assessing the Environmental Footprint of an Industrial Product: A Comparative Study of Two LCA Software Tools

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Abstract – Life Cycle Assessment (LCA) is a key method for evaluating the environmental impacts of products throughout their life cycle. As sustainability demands increase, reliable LCA tools have become essential for informed decision-making. This study compares two prominent LCA software tools, SimaPro and OpenLCA, to assess their capabilities and applicability in analyzing the environmental footprint of display cabinet production. This research uses a structured method, including data collection, inventory analysis, impact assessment, and interpretation, to highlight significant differences between the tools. Both follow international LCA standards but vary in database integration, impact assessment methodologies, and customization flexibility, leading to distinct results even for identical product systems. These variations underscore the importance of understanding the unique features of each tool. The findings show that SimaPro's extensive databases and advanced analytics make it suitable for complex studies, while OpenLCA's open-source accessibility and compatibility with diverse datasets provide cost-effective solutions for smaller projects or academic purposes. Both tools exhibit strengths and limitations, emphasizing the need to align tool selection with project goals and resources. This study aims to guide researchers and industries in selecting appropriate LCA software while promoting transparency and consistency in environmental assessments. The research advances sustainability in industrial applications by fostering accurate and effective LCA practices.

Keywords – Life Cycle Assessment, Sustainability, Environmental Impact, LCA Software Comparison, SimaPro and OpenLCA

Acknowledgments: This study was produced from Hüseyin OK's MSc. thesis. We extend our sincere gratitude to Standart TİM for their invaluable support in providing the data essential to this research.

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Framework Development of Functional Literacy Curriculum for Non-Formal Education

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Abstract – To achieve sustainable development goals, it is inevitable to strengthen adult literacy and non-formal educational programs. Many governmental and non-governmental organizations are taking this task on priority. Non-formal education centers and adult literacy centers are striving to expand literacy and educational services to out of school and out of age group learners. Evidence is available that most of these programs remain ineffective in achieving objectives particularly related to mathematical literacy. One of the major causes of this problem is theoretical, non-functional, and boring mathematical literacy curriculum. In the light of current situation this research was planned to develop a framework for the functional literacy curriculum in the non-formal education setting. Qualitative approach was applied to conduct this research. Focus group discussion with experts from the Math literacy and functional literacy and non-formal education background were conducted. Fifteen statements were developed in the form of questions for focus gr from the field of the adult literacy, non-formal education. Objective development, content selection/ learning experiences, teaching methodology and assessment system development were the main areas of discussion. Basic numeracy and problem-solving skills, financial and digital literacy, positive attitude towards mathematics were suggested outcomes of the functional literacy curriculum. Cultural sensitivity, individual interest and adult needs considered while developing the functional literacy curriculum. Experts suggested that the methodology used in teaching math literacy in non-formal settings emphasizes the relevance and practical applications of math, as well as the development of critical thinking and problem-solving skills. The use of collaborative learning, visual aids, and technology to make learning math more accessible and engaging. Performance based assessment, collaborative assessment and portfolios were recommended as the techniques of assessments of functional literacy content. In addition, technology is increasingly being used in non-formal settings to make learning math more accessible and engaging. This can include online tutorials, interactive simulations, and digital games.

Keywords: Functional Literacy Curriculum, Non-formal Education, Adult Literacy, Framework Development

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Reuse of Historical Buildings and Their Evaluation as Tourism Destination Points in Terms of Alternative Tourism Diversity: The Dedeoğlu Mansion Example

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Abstract – Historical structures are an inseparable part of a city's cultural identity and represent important structures that have been carried from the past to the present. These structures not only have architectural value, but also contain traces of the social, economic and cultural life of that period. In this context, one of the most important approaches for the preservation and sustainability of historical structures is re-functioning. This process requires consideration of the physical characteristics of the structure as well as its environmental and social context. The preservation of historical structures and, in particular, their reintegration into daily life with new functions is one of the most important elements of preserving the identity and character of a city. After the restoration of these historical structures, each one becomes a tourist destination and makes a great contribution to cultural tourism.

This study examines the restoration process and the effects of re-functioning of the Dedeoğlu Mansion located in the İskender Neighborhood, 8021 plot, 7 parcels in the city center of Isparta, and its value in terms of cultural tourism. Within the scope of the research, the historical values of the Dedeoğlu Mansion before and after the restoration were comparatively examined. In addition, the positive and negative effects of re-functioning on the physical structure of the building, the value it adds to the surrounding street, and the advantages and disadvantages it provides for users are also discussed. In addition to the preservation of historical structures, this process emphasizes their contributions to the urban environment, the cultural memory of society, and the contribution they provide to the district in which they are located within the scope of cultural tourism.

Keywords – Historical Buildings, Restoration, Cultural Heritage, Architectural Conservation, tourism.

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A Computational Analysis of the Adsorption Process of Amoxicillin Using Cellulose from Luffa Cylindrica Fibers

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Abstract – In this manuscript , we have performed a computational study (simulation) of the adsorption of a pharmaceutical pollutant such as amoxicillin by glucose, which is an essential component of cellulose that in turn is an essential component of Luffa fibres. First , we have used the PM6 semi experimental method in calculat ing the energy and thermodynamic properties. The results obtained showed that the resulting complex is more stable than the reactants, and the reaction is exothermic. The free energy value shows that the reaction is spontaneous and relatively irreversible. For the NCI, RDG and QTAIM analysis, we have used the Multiwfn and VMD program to find the wave function in calculating the electroni c density and the properties elicited from it. From the obtained results in these two analyses , we concluded that the non-covalent interactions such as electrostatic interactions and hydrogen bonds are responsible for the stability of the glucose amoxicill in complex. These results show that the adsorption is of a physical nature and that the Luffa fiber can be used in water treatment of amoxicillin.

Keywords – Water treatment , Adsorption, L ufaa, Amoxicillin , PM6 NCI analysis , QTAIM, analysis RDG.

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Learning of Non-Looped Neural Networks by Particle Swarm Optimization for the Case of the Function Approximation Problem

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Abstract – This paper explores the application of Particle Swarm Optimization (PSO) to train non-looped neural networks. PSO, a meta-heuristic optimization algorithm, is employed to optimize the weights and biases of the neural network, leading to improved performance and faster convergence. The proposed approach is particularly effective for non-looped architectures, which lack recurrent connections and are often used in feedforward neural networks. By leveraging the collective intelligence of the particle swarm, PSO efficiently explores the vast search space of possible network configurations. The algorithm iteratively updates the position and velocity of each particle based on its individual experience and the global best solution found so far. This collaborative optimization process enables the network to learn complex patterns and relationships within the data. The effectiveness of the proposed method is demonstrated through extensive experiments on various benchmark datasets. The results show that PSO-trained non-looped neural networks achieve superior performance compared to traditional gradient-based optimization techniques, especially when dealing with non-convex optimization problems. This work contributes to the advancement of neural network training by providing a robust and efficient optimization framework. The proposed approach has the potential to be applied to a wide range of applications, including pattern recognition, classification, and regression tasks.

Keywords – Non-Looped Neural Networks, Particle Swarm Optimization, Function Approximation, Machine Learning, Neural Network Training.

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A fungicide, Prosaro 250 EC, induced liver histopathological alterations in male rabbits

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Abstract **-** A pesticide can be defined as a toxic chemical substance or a combination of substances or biological agents that are deliberately released into the environment to avert, deter, control and/or wipe out populations of insects .

Agricultural pesticides aid boosting agricultural output, but at the same time impose severe negative effects on both human health and the environment .

The present study was aimed to evaluate the toxicological effects of Prasaro 250 EC (Prosaro 250 EC is composed of two active ingredients, namely prothioconazole and tebuconazole and inert ingredients as N, N-dimethyldecan amide), a commonly used triazole fungicide in Algeria. Here, 24 male rabbits were equally divided into the control group (Control) received distilled water and standard diet, and three treated groups received orally three different doses of Prosaro 250 EC (0.093 (G4); 0.186 (G5), and 0.465 mg/kg body weight (G6)) for 21 consecutive days. At the end of treatments, animals were euthanized by decapitation, and their liver were removed, weighed, and fixed in 10% formalin for histopathological evaluation according to the routine histological protocol (Houlot, 1984). Results revealed marked histological alterations in Prosaro 250 EC treated rabbits, showing necrosis and inflammation of hepatocytes, cell congestions, sinusoidal dilatation, and cellular vacuolation.

Keywords : Toxicity, Prosaro 250 EC, histopathological, male rabbits

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Preliminary data on the presence of CanL in dogs from two major districts of Albania

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Abstract **–**Canine leishmaniasis (CanL) is an endemic widespread disease in Mediterranean countries, including Albania. This parasitic infection represents a major veterinary and human health concern. However, the distribution of the disease in Albania is heterogeneous and not all districts have been equally studied and characterized. This work describes the situation of CanL in dogs from two main districts of Albania, Tirana and Durrësi. The survey was performed during 2024 throughout the districts. In total were collected 82 blood samples from suspected animals with CanL, 58 in Tirana and 38 in Durresi district. Blood samples were analyzed by performing IFAT test (serological immunofluorescence antibody test). From the laboratory evaluation resulted positive 17.2 % of dogs from Tirana and 20.5 % of dogs from Durrësi district. The results obtained from the study revealed that CanL is an endemic infection among dogs from two major districts of Albania. Further study is needed with the aim to have a clear map of CanL spread in Albania.

Keywords – canine leishmaniasis, district, IFAT test

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Plastik Enjeksiyon Süreçlerinde Isı Kontrolü: Sıcaklık ve Sürenin Optimizasyonu

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Özet **–** Bu çalışma, plastik enjeksiyon kalıplama süreçlerinde ısıtma sıcaklığı ve süresinin optimize edilmesinin kritik önemini ele almaktadır. Farklı plastik türlerinin termal özellikleri detaylı bir şekilde incelenerek, termoplastikler ve termosetler için uygun ısıtma stratejileri geliştirilmiştir. Uygun sıcaklık profillerinin uygulanmaması durumunda, malzeme akışkanlığında bozulmalar ve istenmeyen kaynak hataları gibi sorunların ortaya çıkabileceği vurgulanmaktadır. Bu amaçla, 150 W, 250 W, 350 W ve 500 W gücündeki ısıtıcılarla yapılan analizlerde eriyik sıcaklığının hedeflenen 207-227 °C aralığına ulaşması sağlanmış, enerji beslemesi ve sıcaklık değişimleri değerlendirilmiştir. Üç farklı kelepçe ısıtıcı konumlarının ve güç seviyelerinin optimizasyonu, en uygun performansı belirlemek üzere gerçekleştirilmiştir. Sonuçlar, belirli güçlerde sağlanan ideal sıcaklık kontrolünün, kalıp dolgu sürecinde malzeme kalitesini artırdığını göstermektedir. Elde edilen bulgular, uygun sıcaklık profillerinin sürdürülmesinin yalnızca optimal malzeme akışını sağlamakla kalmayıp, nihai ürün kalitesini de artırmak için elzem olduğunu ortaya koymaktadır. Ayrıca, enjeksiyon süreci sırasında sıcaklık dağılımının izlenmesi, kalıp ortamının daha iyi kontrol edilmesine olanak tanıyarak, termal dalgalanmalardan kaynaklanan kalite sorunları riskini azaltmaktadır. Bu araştırma, plastik endüstrisindeki üreticiler için değerli kılavuzlar sunarak enjeksiyon kalıplama operasyonlarında verimlilik ve tutarlılığın artırılmasına katkıda bulunmaktadır. Gelecek çalışmalar, daha karmaşık geometriler ve değişken işleme senaryolarının etkisini inceleyerek bu ısıtma stratejilerinin geliştirilmesine olanak tanıyabilir ve yüksek kaliteli plastik bileşenlerin üretimine katkıda bulunabilir.

Anahtar Kelimeler – Plastik enjeksiyon, ısıtma sıcaklığı, kelepçe ısıtıcı, termostat (ısı probu)

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Partial Integro-Differential Evolution Inclusions with Infinite Delay Depending on the State

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Abstract **–** A large class of scientific and engineering problems is modeled by partial integro-differential equations, which can be described as semi-linear integro-differential evolution equations in Banach spaces using semi-groups theory. Our problem through this work is to proving the existence of mild solutions for a first order class of partial functional integro-differential evolution inclusions with delay, when this delay is infinite and is depending on the researched solution over the real non negative half line J. The response of the system depends also on the past history of the system. Sufficient conditions are considered here to get the existence of mild solutions by reducing this research to the search for the existence of fixed points of appropriate operators by applying different nonlinear alternatives. This method is based on famous fixed point theorems and is combined with semi group theory. We are going to apply the non-linear alternative of Frigon for multivalued contraction maps in Frechet spaces. we consider the problem,

$$y'(x) \in A(t)y(t) + \int_0^t I(t,s) f\left(s, y_{\rho(s,u_\rho)}\right) ds, \qquad a.e. \qquad t \in J$$

$$y_0 = \phi \in \mathcal{B},$$

where $\mathcal{B}$ is the phase space, $f: J \times \mathcal{B} \to E$, $I: J \times J \to E$, $\rho: J \times \mathcal{B} \to \mathbb{R}$ and $\phi \in \mathcal{B}$, are given functions and $\{A(t)\}_{t\geq 0}$ is a linear closed operators family from E into E which generates an evolution system of operators $\{U(t,s)\}_{(t,s)\in J\times J}$ for $0 \leq s \leq t < +\infty$. Let us consider the element of the phase space y_t the history of the state from time $t \leq 0$ up to the present time t defined for any continuous function y and any $t \geq 0$ by $y_t(\theta) = y(t+\theta)$.

Keywords – Partial integro-differential evolution inclusions; mild solution; state-dependent delay; fixed-point; non-linear alternative; semi-group theory; Frechet space.

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Square roots of some special Toeplitz and bloc Toeplitz matrices

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Abstract **–**In this work, we present formulas to compute square roots of some special Toeplitz matrices and special bloc Toeplitz matrices. The paper is rich by examples to illustrate our results.

Keywords –A triangular Toeplitz matrix, a triangular bloc Toeplitz matrix, square root, Taylor's formula.

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TCP for Data Centers: Short Flows and Incast

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***Abstract*—** Data center network challenges include meeting modern application demands due to limits of the traditional Transmission Control Protocol (TCP). This study evaluates the TCP Incast phenomenon, a common issue in data center environments where multiple servers respond simultaneously, leading to network congestion, packet loss, and retransmission delays. To explore the impact of TCP Incast on data center performance, the paper investigates key performance indicators including bandwidth utilization, server concurrency, and load balancing effectiveness. By modeling scenarios and evaluating mitigation strategies, the research proposes practical solutions to enhance TCP efficiency in high-bandwidth, low-latency data center environments. Results highlight the importance of bandwidth scaling, advanced load distribution algorithms, and optimized traffic scheduling mechanisms to mitigate the adverse effects of TCP Incast, thereby improving overall system performance.

Index Terms—TCP Incast, data centers, short flows, bandwidth utilization, server concurrency, load balancing, congestion control, traffic scheduling, low latency, high throughput.

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Characterization of periodic linear recurrent sequences over a commutative field with constant coefficients

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Abstract **–** Let K be a commutative field of characteristic zero, K^{alg} its algebraic closure (assumed commutative), and r(K) the set of linear recurrent sequences with coefficients and values in K. The objective of this work is to determine the minimal characteristic polynomial of a sequence in r(K). Additionally, a characterization of a periodic sequence in r(K) is provided, along with the determination of its primitive period and primitive numeric value.

Keywords – periodic sequence, characteristic polynomial, recurrent sequences, its primitive period and primitive numeric

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EARTHWORMS DIVERSITY IN FOREST ECOSYSTEMS OF ALGERIA

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Abstract - Earthworms play a crucial role in forests by contributing to the decomposition of organic matter and the aeration of soils, which enhances soil fertility and structure. Their biodiversity, although often underestimated, is a key indicator of the health of forest ecosystems. A study conducted in two forests in Western Algeria, Oran (Forêt des Lions S1) and Mascara (Hacine S2), during the peak activity periods of earthworms in January and February 2024, allowed for a better understanding of their presence and distribution. The soils in these sites exhibit drought characteristics (humidity < 20%). Differences in earthworm biomass between the stations, as well as variations in developmental stages and average sizes of the collected individuals, were revealed. In the first station, 15 juveniles, 8 sub-adults, and 6 adults were collected, with average sizes of 2.36 ± 0.93 cm, 4.33 ± 1.97 cm, and 9.26 ± 4 cm, respectively. In February 2024, the second station recorded the collection of 8 juveniles, 2 sub-adults, and 1 adult, with average sizes of 2.4 ± 0.72 cm and 4.25 ± 0.35 cm, respectively. The average biomass measurements were 2.49 ± 0.73 g/m² for juveniles at S1 and 1.74 ± 0.51 g/m² for S2. For sub-adults, the averages were 1.31 ± 0.31 g/m² for S1 and 1.56 ± 0.43 g/m² for S2. Regarding adults, an average of 19.08 ± 7.75 g/m² was recorded for S1. In the forest ecosystems, we identified *Apporectodea rosea* (Endogeic), *Apporectodea trapezoides* (Anecic), and *Amynthas sp*. Identifying earthworm species will provide new insights into their distribution, biology, behavior, and their importance in terms of bio-indication and soil fertility.

Keywords: Forest, Earthworms, Bio-indicator, Resilience, Fertility.

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Optimization of Synthesis Methods to Predict the Properties of ZnO Materials Using Machine Learning

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Abstract – This review of the literature investigates the synthesis of zinc oxide (ZnO) and the use of machine learning (ML) techniques to forecast its characteristics. ZnO is a multipurpose substance that is frequently utilized in energy devices, photonics, and electronics. Conventional techniques for forecasting its characteristics can be expensive and time-consuming. Recent developments in machine learning methods that provide accurate and effective substitutes for property prediction are highlighted in this review. We examine the different machine learning models, feature engineering techniques, and data kinds applied in these investigations. The advantages and disadvantages of combining materials science and machine learning are also covered, with a focus on the significance of interdisciplinary cooperation, high-quality data, and model validation.This review attempts to direct future studies into the synthesis and property prediction of ZnO using machine learning techniques by offering a thorough summary of recent work.

Keywords – Zinc Oxide (ZnO), Machine Learning, Property Prediction, Feature Engineering.

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Synthesis of gold catalysts supported on Ce-modified mesoporous zirconia: Effect of Ce/Zr molar ratio on the dispersion of gold particles

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Abstract Ce-modified mesoporous zirconia supports were prepared by a templating sol-gel method with a variation of Ce/Zr molar ratio. 1% of Au was loaded on Ce-modified mesoporous zirconia by deposition precipitation method. $CeZrO_2$ and $Au/CeZrO_2$ samples were characterized by XRD, N2 adsorption-desorption, H_2-TPR, MET and DR/UV-vis,. The results showed that the Ce/Zr molar ratio had a great influence on the dispersion of gold particles.

Keywords: mesoporous ZrO2, Ceria, Gold

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The effect of the nature of support on the performance of gold supported catalysts for total oxidation of toluene

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Abstract **-** Volatile Organic Compounds (VOCs) emitted in air during industrial processes are recognized as major contributors to air pollution and are considered to be dangerous to human health. Catalytic oxidation is one of the most important processes for VOCs destruction, since VOCs oxidation over a catalyst takes place at temperature much lower than those required for thermal destruction. Catalytic oxidation of VOCs has been performed either with noble-metal catalysts or with non-noble metal catalysts, where the noble-metal catalysts generally exhibited better catalytic performance.

Gold has been until recently considered as one of the least catalytically useful metal because of its chemical inertness. However, in the last decade, it has been widely proved that it is possible to prepare gold nanoparticles deposited on metal oxide supports, which exhibit high catalytic activity towards oxidation reactions. There is a general consensus that the structure and stability of small gold particles is a function of the chemical and physical nature of the support on which they reside.

This work was undertaken to study the effect of the nature of support on the performance of gold supported catalysts for total oxidation of toluene. For this purpose, mesoporous Co3O4, Al2O3, and ZrO2 supports were used. The catalysts have been characterised by means: H2-TPR, X-ray powder diffraction, nitrogen adsorption, TEM and diffuse reflectance ultra-violet visible spectroscopy (DR/UV-vis).

Keywords:, mesoporous oxide, gold, deep oxidation, toluene.

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Comparative study of Ab-initio between the CASTEP method and quantum espresso in the case of the semiconductor

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Abstract **–** the calculation of material properties using wave density theory or DFT, which facilitated knowledge of the behavior of semiconductor materials. is done using codes like the famous CASTEP, which gives precise results. researchers have developed competing, unpaid, free programs that do a good job providing accuracy and credibility in calculations, for researchers, for the dissemination of science, and these are the type of open source programs that run on Linux .

We chose quantum espresso and compared the equivalence of the calculations in CASTEP to see if the results were close.

Keywords – Include at least 5 keywords or phrases

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Modeling the Performance Impact of Misinformation on Social Media Servers

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Abstract – Maintaining performance is a critical challenge for social media platforms. This paper presents a queuing-based model to analyze the performance of such servers, focusing on latency and the impact of misinformation. We extend a foundational M/M/c queuing model to incorporate realistic factors like network delays, caching, and diverse request types. Subsequently, we explore how the spread of misinformation, simulated through increased arrival rates and reduced service rates due to content moderation, affects server performance. The model provides a framework for understanding the interplay between technical parameters and content dynamics in a social media environment.

Keywords – Performance, Misinformation, Queuing Model, Latency, Social Media

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Enhancement of Corrosion Resistance in Sintered Nd-Fe-B Magnets through Cu and Mg Particle Doping

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Abstract – The study conducted on recycled Nd-Fe-B magnets doped with Cu and Mg highlights the significant role of doping, even at very low concentrations. It aims to investigate the impact of copper and magnesium particle doping on the performance of Nd-Fe-B magnets to broaden their applications. Based on a literature review, optimal doping percentages were determined, followed by the preparation of compacted pellets from recycled raw materials and subsequent sintering. The obtained samples were characterized using electrochemical techniques, optical and electron microscopy, as well as EDS and XRD analyses to identify corrosion products. Results demonstrate that copper doping, even in small amounts, significantly enhances corrosion resistance, while magnesium has a limited effect, possibly due to inadequate particle size. Microscopic observations reveal notable changes in grain sizes and boundaries, resulting in a more homogeneous structure in copper-doped samples. Although this homogeneity improves corrosion resistance, it is accompanied by a reduction in hardness. These findings underscore the potential of doping in optimizing recycled Nd-Fe-B magnets.

Keywords – Grain Boundary Modifier; Rare Earth Magnets; NdFeB Properties; Doping Powder.

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Using PyAMS Software for Modeling and Simulation of Different DC-DC Converters for MPPT Applications in Photovoltaic Systems

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Abstract – In this work, we will explore the significance of the PyAMS software (Python for analog and mixed signals) in modeling and simulating the elements of one of the main components of the photovoltaic (PV) energy system: the direct current to direct current (DC-DC) converter. We will begin by modeling the analog elements of the DC-DC converter, including the resistor, capacitor, solar panel, Indictor, diode, and MOSFET, and then proceed to apply these models in testing various types of DC-DC converters. The role of the DC-DC converter in Maximum Power Point Tracking (MPPT) applications for solar panels is to adjust and optimize the output voltage to maximize energy extraction efficiency. By converting the voltage output from solar panels into an optimal voltage matching the maximum power point of the system, the DC-DC converter plays a crucial role. This study addresses the examination of different types of DC-DC converters, considering factors such as efficiency, computational time, and complexity. The performance evaluation of each DC-DC converter is used in MPPT applications.

Keywords – PyAMS, DC-DC converter, MPPT, photovoltaic, Modeling

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Metal Ergitme Fırınlarında Enerji Verimliliğinin Artırılması: Hava ve Oksijen Yakıtlı Sistemlerin Karşılaştırılması

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Özet – Türkiye'de metal sektöründe, ergitme fırınlarında enerji kaynağı olarak genellikle doğalgaz tercih edilmektedir. Ancak yanma reaksiyonunun gerçekleşmesi için oksijen vazgeçilmez bir bileşendir. İşletmeler oksijen ihtiyacını atmosferik havadan karşılayabildiği gibi, doğrudan oksijen saflaştırma proseslerinden de temin edebilmektedir. Ergitme fırınlarında tüketilen enerji miktarları, fabrikaların enerji maliyetlerinin en büyük kalemlerinden birini oluşturmakta ve karbon emisyonlarının da en önemli kaynakları arasında yer almaktadır. Bu çalışmada, metal ergitme fırınlarında hava yakıtı ile oksijen yakıtı kullanımının enerji verimliliği açısından karşılaştırması yapılmıştır. Çalışmada sektörel verilerden yararlanılarak detaylı bir analiz gerçekleştirilmiştir. Saf oksijen yakma sistemlerinde, bir birim doğalgaz kullanımına karşılık iki birim oksijen gerekmekteyken, hava yakıtı kullanılan sistemlerde bu oran 1/11 seviyesine yükselmektedir. Bu durum, hava yakıtlı sistemlerde oluşan atık hava miktarlarının önemli ölçüde artmasına neden olmaktadır. Aynı kapasiteye sahip iki fırından alınan veriler incelendiğinde, oksijen yakıtlı sistemlerde ihtiyaç duyulan doğalgaz miktarının hava yakıtlı sistemlere göre %25 oranında daha düşük olduğu görülmüştür. Bu da fırınların enerji verimliliğini doğrudan artırmaktadır. Daha az enerji kullanılarak aynı işin gerçekleştirilmesi, fabrikaların enerji verimliliğini artırmakta ve karbon emisyonlarının azalmasına önemli katkılar sağlamaktadır.

Anahtar Kelimeler – Metal Ergitme Fırınları, Enerji Verimliliği, Oksijen Yakıtlı Sistemler, Karbon Emisyonları, Yanma Prosesleri

Teşekkür - Bu çalışmaya verdikleri değerli katkılarından dolayı ŞAHİNLER METAL ve Üretim Müdürü Yılmaz Aydın'a teşekkür ederiz.

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Comparing the Efficiency of Packed U-Cell and Conventional Multilevel Inverter Topologies

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Abstract – Multilevel inverters are becoming essential for most high-voltage, high-power, and high-power medium-voltage electronic applications. MLIs offer many output levels suited to satisfy the varied demands of high-voltage and power applications. Besides enhancing output levels, MLI can reduce voltage stress (dv/dt) and the total harmonic distortion across the power switches. The extensive advancement of new MLI topologies on current ones enhances the ability to increase output levels while utilizing fewer components. Three significant topologies of multilevel inverters are compared in this work: cascaded H-bridge inverters, diode-clamped inverters, and flying capacitors. Electromagnetic interference (EMI) and total harmonic distortion results are compared. To do this comparison, meticulous MATLAB/Simulink simulations are used to analyze these inverters. These multilevel inverter designs frequently encounter complexity issues, highlighting the need for a more simplified approach. This study introduces a novel structure known as the 'packed u-cell 5 ' within the MATLAB/Simulink software. Its THD characteristics are analyzed to assess this novel structure's efficacy. By implementing PID control, the work also seeks to enhance the total harmonic distortion performance of the 'packed u-cell 5 ' structure.
Keywords: electromagnetic interference, Proportional-Integral-Derivative control, total harmonic distortion, PUC inverter, MLI.

Keywords – Comparing the Efficiency, Conventional Multilevel Inverter

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Impact of Dynamic Pricing on Consumer Behavior and Market Competition under Digital Transformation

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Abstract – Integrating AI into various businesses has attracted much attention regarding its use in pricing tactics. This article explores AI-driven pricing techniques, focusing on dynamic pricing and its significant impact on consumer behavior and market competition. Facilitated by sophisticated machine learning algorithms, dynamic pricing allows for real-time adjustments based on various variables, including demand, competitive pricing, and market trends. This research examines the complex effects of AI-driven dynamic pricing on customer behavior, focusing on how personalized and context-sensitive pricing influences purchasing choices. Additionally, we examine the effects of dynamic pricing on market competitiveness, assessing its ability to enhance revenue for organizations while maintaining fair and transparent procedures. Through case studies from several sectors, we seek to explore the effectiveness of AI-driven pricing models and their impact on market dynamics. This study discusses the intersection of AI, pricing strategies, and market dynamics by comprehensively examining current literature, empirical investigations, and practical applications. The findings presented here provide important insights for academics, practitioners, and policymakers addressing the changing dynamics of AI in pricing and enhancing understanding of its implications for consumer decisions and competitive market conditions. The paper demonstrates the influence of price dynamics on consumer behavior, contributing to the scholarly discourse on incorporating AI into business frameworks, especially on dynamic pricing tactics in competitive marketplaces. It offers pragmatic recommendations for enterprises to enhance real-time pricing strategies by acknowledging the significance of market competition and consumer preferences while emphasizing the potential risks of elevated customer price sensitivity in dynamic pricing scenarios.

Keywords – AI-driven pricing, Dynamic pricing, Machine learning in pricing, Revenue optimization, Pricing strategies

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Solar Synergy: Innovative Strategies for Data Centers Energy Efficiency and Sustainability

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Abstract – One of the current trends related to data centers is providing it with renewable energy sources. This paper suggests an analysis technique for a model uses solar panels energy to power a data center consists of 100 traditional servers, physical infrastructures, 5 backup batteries. The analysis passes through three phases: Initially, the power consumption model of the data center is proposed to show the variation in traffic and total energy consumed. Then, a solar system model is designed according to the power needed. The suitable size of PV was found to be 613 solar panels that delivers an energy of 2.967MWh. At the last phase, the desired battery capacity is chosen as (10000Ah×48V) to accommodate the solar energy production. The problem occurred when there is a shortage in solar batteries' energy especially, during the night when no sunlight exists. An integration method between using the solar energy with traffic consolidation technique (ON/OFF algorithm) is suggested to overcome this issue and extend the battery life. Finally, this model is evaluated by the number of active servers according to the number of batteries available since it found that it reduced to (10-35) % of the total number when only 4 batteries are used and the effective power provided will be between (1.68-1.904) MWh with an energy saving of about 867KWh for the case of only 10% of the total servers are active.

Keywords – Data Centers, Traffic-Aware, Power Management, Energy Efficiency, Power Consumption, Renewable Energy, Solar Panels.

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Immobilization of Ag loaded graphene oxide on canvas fabric support for reduction of 4 nitrophenol

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Abstract **–**This research focuses on synthesizing a novel heterogeneous catalyst using modified canvas fabric (CF) decorated with silver metal nanoparticles on graphene oxide nanosheets (Ag-GO/ CF). The process involves coating the fabrics (CF) with graphene oxide (GO) nanosheets through sonication. Subsequently, silver nanoparticles are deposited in situ and reduced on the GO surface, resulting in the formation of the Ag-GO/CF composite. Various physicochemical characterizations were conducted to examine the interfacial interactions between CF, GO, and Ag nanoparticles. The catalytic activity of the nanocomposite was assessed by hydrogenating 4-nitrophenol (4-NP) to 4-aminophenol (4-AP) in the presence of sodium borohydride (NaBH4). The results showed that the 10%Ag-5%GO/CF with a surface of 6 cm2 (3×2 cm) exhibited the highest catalytic activity, achieving a reduction efficiency of over 96% in 5 min. The 4-NP reduction reaction rate was well-fitted with a pseudo-first-order kinetics model with an apparent reaction rate constant (Kapp) of 0.676 min−1. Furthermore, the Ag-GO/CF composite demonstrated remarkable stability over successive cycles, with no noticeable decrease in its catalytic activity, suggesting its promising application for long-term chemical catalytic processes. This synthesized composite can be easily added to and removed from the reaction solution while maintaining high catalytic performance in the reduction of 4-NP, and it could be beneficial in avoiding problems related to powder separation.

Keywords - 4-Nitrophenol, Graphene oxide, Canvas fabric, Silver nanoparticle, Dip-catalyst

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Antioxidant effecacy of *Mentha spicata* methanolic extract

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Abstract – The use of medicinal plants today is the form of the most widespread medicine worldwide. Utilizing aromatic plants as interesting source of phytochemicals constitute one of the largest scientific concerns. Mentha is a medicinal and aromatic plant belonging to the Lamiaceae family, it is used and recognized for its therapeutic virtues in traditional medicine. The present study aims to evaluate the antioxidant activity of methanolic extract of *Mentha spicata* L. collected from Ouled Driss region, Souk Ahras. Furthermore, The determination of total polyphenols in the leaf extract was carried out according to the Folin-Ciocalteu method. The antioxidant activity was evaluated against a radical cation, using tow synthetic antioxidants positive controls (BHT and Ascorbic acid). The phytochemical analysis indicated that leaf of *M. spicata* comprising anthocyanins, leucoanthocyanins, flavonoids, tanins and terpenoids. The obtained results showed also that plant extract contained average level of polyphenols and exhibited a remarkable scavenging effect against the DPPH radical. The present research demonstrated the antioxidant efficacy of *M. spicata* extract.

Keywords – Mentha, antioxidant activity, phytochemical study, polyphenols, DPPH.

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Study of the improvement of mechanical proprieties of Armco iron after laser boriding treatment

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Abstract – Armco iron is a highly pure form of ferrous alloy with an iron concentration exceeding 99%. To ameliorate its mechanical proprieties, boriding treatment can be the appropriate method. The aim of this study is the application of laser boriding treatment on Armco iron to evaluate its effect on the microstructure and the microhardness. In this investigation two specimens were studied, the first one was laser borided and the second was laser heated, using the TRUMPF turbo laser 2600 equipment at laser power of 1020W. After the treatment the microstructure was analyzed using an SEM device and the microhardness was measured along the cross section of the axis laser tracks using micrometer tester with diamond indenter. The microstructural analyzes reveals the formation of three zones, the re-melted zone near the top surface with formation of iron borides FeB and Fe_2B for the specimen wish was borided and grain refining for the second, the heat affected zone and the substrate material. The microhardness increases on the re-melted zone in the case of laser boriding treatment due to the borides formation. The results confirm that the laser boriding treatment improve the mechanical proprieties of Armco iron.

Keywords – laser, boriding, microstructure, microhardness, re-melted zone, heat affected zone,

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Advancing the Optoelectronic Properties of $LiAuF_4$: A Comparative Study Using HSE06 and GGA Functionals

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Abstract **–** This study revisits the optoelectronic properties of the ternary compound $LiAuF_4$, incorporating advanced hybrid functional calculations (HSE06) for a more accurate characterization. The work provides a comparative analysis between HSE06 and the previously studied GGA functional, focusing on the structural, electronic, and optical properties of the material. HSE06 calculations reveal refined electronic band structures, showcasing $LiAuF_4$ as a direct band gap semiconductor with enhanced accuracy compared to GGA results. Structural stability is validated through consistent lattice constants and atomic coordinates. Optical properties, including the real and imaginary dielectric components, refractive index, and absorption coefficient, are systematically evaluated, highlighting notable differences in UV absorption behavior between the two approaches. This comparative study enhances the theoretical understanding of $LiAuF_4$, emphasizing its potential for ultraviolet optoelectronic applications, including photodetectors, sensors, and UV light-emitting diodes (LEDs). The findings contribute to bridging the gap between theoretical predictions and future experimental investigations, offering insights into the material's viability for next-generation optoelectronic devices.

Keywords – Advanced DFT simulations; Comparative band structure analysis; HSE06 vs GGA; Hybrid functionals; $LiAuF_4$ optoelectronic properties; Ultraviolet absorption.

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Production of Green Hydrogen using Solar Energy: An Innovative Energy Conversion System

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Abstract **–** The global transition toward green gas production is essential to achieving sustainable development goals and reducing reliance on fossil fuels. This work focuses on the development of an innovative solar hydrogen production system designed to be efficient, cost-effective, and environmentally friendly. The proposed system utilizes photovoltaic (PV) modules to harness solar energy, coupled with an alkaline electrolyzer for water electrolysis, producing clean hydrogen gas. A critical component of the system is the integration of an electronic controller and a chopper, which enhance energy conversion and improve hydrogen production rates.

To maximize the efficiency of the PV modules, Maximum Power Point Tracking (MPPT) technology is employed, ensuring optimal utilization of solar energy under varying environmental conditions. This not only increases system reliability but also contributes to reducing operational costs. The system was designed and tested through simulations, and its performance was evaluated against experimental data. Results demonstrated a high degree of accuracy and alignment between the simulated and practical outputs, underscoring the feasibility of the proposed approach.

This system is particularly well-suited for deployment in arid regions where solar energy is abundant, providing a sustainable solution for hydrogen production in these resource-limited areas. The combination of renewable energy utilization, advanced control mechanisms, and scalability makes this system a promising candidate for meeting future energy demands while mitigating environmental impacts.

Keywords Photovoltaic energy; Alkaline electrolyzer; Hydrogen; Arduino board; MPPT; Chopper

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Physical, mechanical, and molecular properties of pectin-xanthan gum composite films

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Abstract – Traditional plastic films that contribute to environmental pollution dominate the packaging industry. The global increase in environmental awareness and the need for sustainable practices have led to significant interest in edible and biodegradable films originating from renewable resources. Composite films, a subtype of biodegradable films, combine two or more materials to enhance their properties. In this study, it was aimed to test the effects of the pectin (P) and xanthan gum (X) ratio on the properties of composite films. Films were prepared using various combinations of P and X, specifically P100, P75:X25, P50:X50, P25:X75, and X100. The highest moisture content (40.66%) was observed in the X100 film. The moisture content was significantly reduced by the addition of P to the film system. Similarly, the use of P increased the thickness value (0.037 to 0.077 mm) of the films. The mixing ratios led to significant changes in the color properties of the films. Moreover, the opacity values of the films ranged from 0.73 to 1.59 Abs/mm. Increasing the concentration of P gradually decreased the opacity. The P50:X50 formulation, which provided the best tensile strength (10.29 MPa) and elongation at break (14.45%) values, was superior to other films in terms of mechanical properties. Fourier transform infrared spectroscopy revealed the physical interactions in the films produced from P and X mixtures. In conclusion, the findings suggest that the properties of the packaging films can be boosted by using a combination of biological materials rather than a single one.

Keywords – Pectin, xantham gum, composite film, packaging, biomaterials.

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Influence of the incorporation of an organic material on the properties of a binder

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Abstract – This research focuses on a composite consisting of gypsum combined with an organic material (ground olive stone), aiming to optimize thermal energy storage applications in buildings. The results of this study will contribute to the advancement of sustainable practices in the construction industry, by encouraging the use of environmentally friendly and locally available resources. This study examines the effect of adding an organic material, derived from olive pulping, on the properties of gypsum. Four series of samples were prepared, containing 0%, 3%, 5%, and 10% by weight of ground olive stones (GOS) in the plaster mixtures for testing. The physico-mechanical and thermal properties of the samples, such as compressive strength, flexural strength, and thermal conductivity, were analyzed. The results show promising potential for improving the insulating capacity of plasters. We focused on optimizing the GOS percentage to reduce thermal bridges and limit heat transfer in cavities. It was observed that thermal conductivity decreases with an increasing percentage of GOS, which enhances insulation. However, compressive and flexural strengths were found to decrease compared to the control sample.

Keywords – gypsum, ground olive stones, compressive strength, flexural strength, thermal conductivity.

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Heat Transfer And Flow Field For Impinging Air Jet

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Abstract – This research delves into a comprehensive analysis of the intricate dynamics governing heat transfer and flow characteristics in a laminar air jet impinging against a stationary wall, utilizing the advanced simulation tool ANSYS FLUENT. The primary objective revolves around investigating the Nusselt number and skin friction coefficient within the plate's impingement region to elucidate the thermal and aerodynamic behavior. A critical aspect of this study involves a comparative analysis of the computed Nusselt number with experimental data (4), demonstrating a generally acceptable correlation between the two.

The geometric settings of the system are standardized through the utilization of a slot inlet jet configuration denoted by 'e,' with a specific geometric ratio of H/e = 2, and a consistent Reynolds number maintained at 300. Moreover, the incorporation of the Boussinesq hypothesis, considering a thermal expansion coefficient of 0.003, adds a layer of complexity to the thermal analysis, enhancing the fidelity of the simulations.

By meticulously examining the interplay between heat transfer phenomena and fluid dynamics in this laminar impinging jet system, this study aims to deepen our understanding of the underlying mechanisms governing such flows. The findings derived from this investigation could potentially inform the optimization of thermal management systems and enhance the efficiency of various engineering applications reliant on impinging jets for heat transfer processes. Through this research, a nuanced insight into the thermal and flow characteristics of impinging jets is sought, contributing to advancements in fluid dynamics and thermal engineering research domains.

Keywords – Impinging jet, heat transfer, skin friction coefficient and NUSSELT number.

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Ankilozan Spondilit Hastalığında Oksidatif Stresin Rolü ve Antioksidanların Etkisi

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Özet - Ankilozan spondilit (AS), aksiyal omurganın kronik inflamatuar bir hastalığıdır. Kronik sırt ağrısı ve ilerleyici omurga sertliği bu durumun en sık görülen semptomlarıdır. Omurganın, sakroiliak eklemlerin, periferik eklemlerin, parmakların ve entezlerin tutulumu karakteristiktir. Sınırlı omurga hareketliliği, duruş bozuklukları, kalça ağrısı, kalça ağrısı, periferik artrit, entezit ve daktilit sıklıkla ankilozan spondilit ile ilişkilidir. Bu aktivite, ankilozan spondilitin değerlendirilmesi ve tedavisini ele alır ve bu hastalığa sahip hastaların bakımının değerlendirilmesinde ve iyileştirilmesinde multidisipliner ekibin rolünü vurgular. Ankilozan spondilit (AS), aksiyal iskelet ve periferik eklemlerin kronik ve ilerleyici inflamatuar bir hastalığıdır. İnflamatuar hastalıklarda, proinflamatuar sitokinlerin artan üretimine, artan oksidatif stres aracıları eşlik eder. AS gelişiminde oksidatif stresin rolü hala tam olarak anlaşılamamıştır. Hücresel solunumla açığa çıkan ATP enerjisi hücresel işlevler için kullanılır. Serbest oksijen radikalleri endojen ve ekzojen reaksiyonlarla üretilir. Serbest radikaller diğer şeylerin yanı sıra aktif oksijeni de içerir. Serbest radikallerin ömrü çok kısadır ve çabuk tepki verirler. Serbest oksijen radikalleri oksidatif strese neden olur. Serbest radikaller dokulardaki lipitlere, proteinlere ve DNA'ya bağlanarak normal doku fonksiyonuna müdahale eder. Serbest oksijen radikallerinin neden olduğu toksinler, detoksifikasyon organları tarafından vücuttan uzaklaştırılır. Temizlenemeyen toksinler bağ dokusunda birikir. Serbest oksijen radikalleri organ yaşlanmasını hızlandırarak kronik hastalıkların ilerlemesine neden olur. Serbest oksijen radikallerinin vücut üzerindeki etkilerini azaltmak ve toksinleri uzaklaştırmak için antioksidanların etkili bir şekilde kullanılması gerekir.Son yıllarda yapılan araştırmalar, oksidatif stres ile bir çok hastalıkarasındaki ilişkiye odaklanmaktadır. Oksidatif stres, vücutta serbest radikaller ile antioksidan savunma mekanizmalarının dengesizliğinden meydana gelir. Sonuç olarak, Ankilozan spondilit ile oksidatif stres arasındaki ilişki incelendi ve AS hastalığın önlenmesine yardımcı olabilecek yeterli antioksidan içeren gıdaların tüketilmesinin faydalı olabileceği sonucuna varıldı.

Anahtar Kelimeler : Ankilozan spondilit, Oksidatifstres, Antioksidan, oksijen radikalleri, nitrik oksit.

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Climate Adaptation in Traditional Housing in the Algerian Sahara: A Manifestation of Ingenuity in Ksour and a Climate Challenge

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Abstract – It is widely acknowledged that architecture and urban spaces can be designed in harmony with the climate. Traditional housings were the precursors of bioclimatic architecture, displaying human adaptation to the environment across the globe: troglodyte housings in China, Spain, and Egypt; bamboo huts in Southeast Asia; igloos in the Arctic; tipis among Native Americans; and Russian izbas. Primitive humans sought to adapt to the climate using very limited materials and techniques, facing the challenge of designing climate-responsive architecture. Traditional Housing in the Algerian Sahara, demonstrate this adaptation to the physical environment and protection against undesirable climatic factors. This study examines the climate adaptation strategies employed in traditional housing within the Algerian Sahara, particularly focusing on the ksour (fortified villages). These settlements exemplify ingenuity in responding to the region's harsh climatic conditions through various levels of adaptation have enabled these Saharan settlements to create spaces suited to harsh climatic conditions, including the compact urban forms, the street system, the parceling system, façades, efficient shading, natural ventilation, and locally sourced materials. These adaptations reflect an optimal expression of habitat, leveraging the climate through bioclimatic principles. By analyzing design principles and architectural practices, the research highlights how ksour architecture balances thermal comfort and energy efficiency while addressing environmental challenges. The findings underscore the relevance of these traditional solutions in guiding sustainable urban design in hot and arid regions today.

Keywords – Climate Adaptation, Traditional Housing, the ksour, Algerian Sahara, ingenuity

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Optimal Indoor AP Placement: A Case Study

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Abstract – Wireless networks in a room are strongly affected by interferences. To alleviate these effects and enhance the performance of the wireless networks, some optimization was carried out. In this work, an analytical study was introduced to determine the optimal number of access points AP with their positions on the ground floor at the Architecture Engineering department building - University of Mosul. The implementation has been done using a web-based Wi-Fi and IoT design tool called Hamina Network Planner, and a Wi-Fi Network Planning and Site Survey Software called NetSpot. The experimental results show that the simulation values of the available access points APs are approximately matched with the real time manual values, achieving the best rates of -22dBm and -31dBm respectively. However, the number of currently available Access Points AP is not sufficient to cover the building area, so that two scenarios were suggested to overcome this issue. In the first scenario, two access points AP have been added at different positions in the building depending on the Hamina Network Planner, and in the second one, the transmitted power has been increased. The simulation results demonstrate that the overall coverage rate enhanced and can include most of the building area.

Keywords – AP Placement, Network Design, Optimization methods, Coverage, Indoor Map, Wi-Fi

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Ecotoxicological effects of a neonicotinoid insecticide on endogeno-acenec earthworms species: Growth Rate

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Abstract – The objective of this work is to evaluate the toxicity of a neonicotinoid insecticide commonly used in the Souk Ahras region using an earthworm species as a bioindicator of the health state of the soil. The toxicity test was carried out in accordance with OECD guideline 222. Different concentrations of contaminants are tested.

The results obtained reveal a toxic effect of the pesticide which results in a clear reduction in weight, depending on time and concentration.

Keywords – Earthworms, Growth rate, Neonicotinoid , Toxicity, .

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Growth rate alteration in *Aporrectodea trapezoides* earthworms exposed to pyrethroid pesticide

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Abstract – The objective of this study is to evaluate the toxicity of an insecticide widely used in the Souk Ahras region belongs to the pyrethroid family against earthworms, a non-target species and bioindicator of soil pollution. Toxicity was assessed by calculating the growth rate over a period of 28 days. The results obtained reveal an intense reduction in the growth rate which explains why this insecticide is very toxic for earthworms.

Keywords – Earthworms, Growth rate, Pyrethroid,Toxicity.

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SURFACE ROUGHNESS AND DEVIATION FROM CIRCULARITY IN WATER JET CUTTING OF AL 7075 T651 SERIES ALUMINUM ALLOY MATERIALS

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Abstract – Today, there are many different methods for cutting hard and difficult to machine materials such as stone, composites, ceramics, metals and alloys. In most of these methods, it is very difficult to achieve the desired surface quality and tolerance range. The abrasive water jet can cut smoothly and within the desired tolerance range with water and abrasive grit without any chemical material. In this study, AL7075 T651 aluminum alloy material was cut on an abrasive water jet machine by changing the cutting pressure, abrasive flow rate and feed rate values at 3 different levels and keeping the other parameters constant, and the surface roughness and deviation of the holes from the circularity values were examined after cutting. According to the data obtained after the experiments, the increase in cutting pressure and abrasive flow rate decreased the surface roughness, while the feed rate increased. Increasing the cutting pressure decreased the deviation from circularity, while the feed rate and abrasive flow rate increased the deviation from circularity.

Keywords – Abrasive waterjet cutting, deviation from circularity, surface roughness, waterjet, waterjet cutting.

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Forecasting Global Network Traffic Trends: The Role of Virtual Reality

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Abstract: Virtual Reality (VR) technology is a network intensive application, which needs reliable network performance for smooth and real like simulation. This study concentrates on the direct, simple and effective utilization of the User Datagram Protocol (UDP) Ethernet communication for VR system to investigate the networks that support the virtual environment.

To investigate the varied dependencies between the network parameters, the study performed the fcable length test, data rate test, packet processing rate PPR test. Researchers strove to identify the various advantages and disadvantages of UDP Ethernet communication of VR applications from the standpoint of the performance factors.

Advanced graphical techniques were applied for visual representation of the presented multi-scalar dependency of network properties and systems performance indices. The study enabled insight into the relationship between proportions of cable length and data transmission parameters to actual operational speed or delay or stability of the particular network.

The results may be informative and helpful for not only the people who work in the development of the VR system but also the network engineers, while UDP Ethernet is raised as a fast and low overhead communication strategy. In this way, considering the basic ideas of performance properties and optimizations, researchers can design systems of virtual reality networks that are more vital for a user.

Therefore, it presents practical contributions to the on-going and upcoming advancement of technology-based VR communication support and a deeper comprehension of the network performance enhancement approaches.

Keywords – Emerging technologies, Virtual Reality, UDP, Modelling, Performance.

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Time Series Analysis for Detecting Real Estate Bubbles A Case Study of East Marmara

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Abstract – A bubble occurs when the value of assets significantly exceeds their intrinsic worth. Detecting bubbles is crucial for policymakers and regulators to mitigate financial crises. This study utilizes a time-series analysis approach to detect real estate bubbles in the East Marmara region, encompassing Kocaeli, Sakarya, Bolu, Düzce and Yalova. Residential Property Price Index (RPPI) dataset (2017=100), covering the duration from January 2013 to January 2024, was acquired from the Central Bank of the Republic of Turkey's Electronic Data Distribution System (TCMB-EVDS). Using the Augmented Dickey-Fuller (ADF), Supremum ADF (SADF), Generalized SADF (GSADF), and Rolling ADF (RADF) tests. The SADF test returned a t-statistic of 32.80130 ($p < 0.0001$), indicating strong evidence of bubble-like behavior, while the GSADF test confirms the occurrence of multiple speculative bubbles with similar statistical significance. The RADF test provided insights into real-time bubble progression, detecting a peak in speculative activity in 2022 when the ADF statistic (5.743343, $p < 0.0001$) crossed critical thresholds. Across all tests, the results indicate that real estate prices in the East Marmara region showed an explosive growth during 2021 and 2022 years, followed by a correction phase at the end of 2022. These patterns coincide with a steep increase in the Residential Property Price Index (RPPI), highlighting the political and economic influences in the region in recent years. These results offer valuable insights for policymakers and market participants in detecting and managing speculative behavior in real estate markets and making changes to minimize financial instability.

Keywords –Time Series Analysis, Bubble Detection, Real Estate, Augmented Dickey-Fuller, GSADF

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Effect of annealing on the Properties of stretched Copper wire

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Abstract **–**The study is proposed within the framework of a scientific collaboration with the ENICAB power transmission cable manufacturing company in Biskra. The purpose of this study is to study the effects of annealing treatment and retention time on the structural, mechanical and electrical properties of industrially stretched copper wires at ENICAB, Biskra, for electrical cables. For this study, several experimental methods of measurement and characterization have allowed us to carry out this work. These are: optical microscopy, scanning electron microscopy, backscattered electron diffraction, Vickers microhardness, tensile test and resistance measurement. Structural and tissue analyses have shown that copper wires heat-treated at 260°C for 30 minutes consist of the same<111>//DN and<001>//DN reinforcements as deformed wires with uniform grain sizes. On the other hand, it has been observed that the fiber<001>//DN remains dominant with a strong decrease in the strength of the fiber<111>//DN after annealing. Also, hardness and mechanical strength and electrical resistivity decrease after holding annealing for 30 minutes at 260° C.

Keywords –copper wires, mechanical strength, electrical resistivity.

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Adaptive Video Streaming with AI-Based Optimization for Dynamic Network Conditions

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***Abstract* –** The increase in video streaming has presented a challenge in handling stream requests effectively, especially over variable networks. This paper describes a new adaptive video streaming architecture capable of changing the video quality and buffer size depending on the data and latency of streamed video, for video streaming VLC media player was used where network performance data were obtained through Python scripts with very accurate data rate and latency measurement. The collected data is analyzed using Gemini AI, containing characteristics of the machine learning algorithm that recognizes the best resolution of videos and the buffer sizes. Through the features of real-time monitoring and artificial intelligence decision making, the proposed framework improves the user experience by reducing the occurrence of buffering events while at the same time increasing the video quality. Our findings confirm that the proposed solution based on artificial intelligence increases video quality and flexibility. This study advances knowledge of adaptive streaming and offers an argument about how intelligent data-driven approaches and AI may be useful tools for enhancing the delivery of video in practical environments.

Keywords – Adaptive video stream, AI, datarate,latency,Gimini

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Green cement with low CO_2 emission

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Abstract – The emission of greenhouse gases is a major concern for environmentalists, and CO_2 is one of the gases known to have significant negative impacts on the environment. Portland cement (PC) is a major contributor to CO_2 emissions. This paper aims to evaluate the impact of partially replacing cement with 0%, 5%, 10%, and 15% calcined mud (CM) by weight on CO_2 emissions. The CO_2 emissions of all these mixtures were estimated based on the proportion of cement replaced by CM. The results demonstrate that substituting up to 15% of cement with CM reduces CO_2 emissions by 14.8%.

Keywords – Calcination, *calcined mud, cement replacement, CO2 emission, green cement.*

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Numerical Analysis of Slope Stability Case of Ben Djerrah (Guelma, Algeria)

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Abstract **–** Landslides are a common phenomenon worldwide and pose a threat to both national economies and human lives. The occurrence of landslides is attributed to various factors, including both natural and human-induced causes. In Algeria, landslides are seen frequently, endangering both persons and property. This geotechnical issue is serious. There are several ways to deal with this problem. But first, it's important to know what causes soil slide. The threatened locations where slippage happens can be investigated on-site and through laboratory research to accomplish this. In this work, we use the Plaxis software's finite element method to examine the Ben Djerrah landslide. Guelma (Algeria) cites Ben Djerrah's slope stability. The most significant findings for this slide were obtained by numerical analysis using the Mohr-Coulomb criterion and the strength reduction method (SRM). To stabilize the slope, we reinforced it using a propped solution with piles. The numerical analysis modeled the Ben Djerrah slope with piles to prevent soil movement and further sliding. The results show that after reinforcement with piles the slope of Ben Djerrah became stable and the failure surface area significantly decreased compared to the original sliding without piles. So the solution chosen is good and can be used in situ.

Keywords –Modeling, FEM, Slope Stability, reinforcement, Analysis

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Reinforcement of Slope by Pile, Using the FEM Case of Ben Djerrah (Guelma, Algeria)

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Abstract **–**Landslides are a common occurrence in various regions of Algeria, posing significant risks to both people and property. Natural factors such as soil composition, weather conditions (such as rainfall), earthquakes, and other causes contribute to landslides. Due to Algeria's geographical location (in a seismic zone), terrain (slopes), soil quality, and other factors, many areas are particularly susceptible to landslides. This represents a critical geotechnical challenge. Addressing this issue requires a comprehensive understanding of the causes of soil instability, which can be achieved through laboratory tests and field investigations in affected areas.This study focuses on the landslide at Guelma, Algeria, using the finite element method through Plaxis software. The slope stability analysis, conducted with the strength reduction method (SRM) and the Mohr-Coulomb failure criteria, revealed key insights. The results indicated that the slope was unstable, with a safety factor of 0.974, and exhibited a rotational failure surface. To enhance stability, a reinforcement solution involving piles was implemented. Numerical modeling demonstrated that the addition of piles effectively stabilized the slope, significantly reducing soil movement and decreasing the extent of the critical failure surface compared to its initial state. So by implementing pile reinforcement, communities can enhance the safety and stability of slopes, protecting lives and property from potential landslide hazards.

Keywords – Reinforcement, Using the FEM Case, Ben Djerrah

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Improving Water Quality Prediction with Artificial Bee Colony Algorithms and Support Vector Machines

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Abstract – Ensuring water quality is essential for protecting human health and the environment. With the increasing presence of pollutants, there has been growing interest in forecasting water quality, with Artificial Intelligence (AI) emerging as a promising tool for improving water quality classification and prediction. This study evaluates several AI algorithms, including Artificial Neural Networks (ANN), Support Vector Machine (SVM), and a hybrid Artificial Bee Colony-Support Vector Machine (ABC-SVM) model, to analyze water quality data and develop an accurate forecasting approach. A dataset containing 10 features was used to assess the performance of these algorithms, using accuracy metrics and Receiver Operating Characteristic (ROC) curves for evaluation. The results show that the ABC-SVM model achieved the highest accuracy, with a classification rate of 92% and an ROC curve of 0.92. These findings highlight the effectiveness of the ABC-SVM hybrid model in predicting water quality and offer a solid framework to aid researchers in enhancing water quality through AI-driven techniques.

Keywords – water quality, Prediction, Artificial intelligence, ABC-SVM, accuracy.

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Sub-chronic effects of a xenobiotic on the mortality and behavior of the terrestrial gastropod *Cornu aspersum*

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Abstract – The increasing presence of xenobiotics in terrestrial ecosystems has raised significant concerns particularly regarding their effects on non-target species such as gastropods. *Cornu aspersum* a terrestrial snail widely recognized as a bioindicator, is frequently used to assess environmental toxicity. This study evaluates the sub-chronic impact of a commonly used product in Algeria on the mortality and behavior of *Cornu aspersum*. By focusing on these aspects, the research aims to enhance understanding of the potential consequences of xenobiotics on terrestrial wildlife and ecosystem health. Adult snails were exposed to five increasing doses of the tested product for one month under controlled conditions using an in vitro scientific approach with continuous monitoring of the mortality and behavior of the treated snails. The results showed that the application of the insecticide led to mortality at all tested concentrations compared to the controls which remained unaffected, as well as alterations in various behaviors and aspects of mortality.

Keywords: Cornu aspersum, insecticide, sub-chronic, bioindicator and mortality.

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Doped Zinc Orthosilicate Nanophosphors with Improved Electrical Characteristics

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Abstract – In the last few decades, the synthesis and investigation of nanostructured materials have emerged as significant interdisciplinary research areas. Nanostructured materials for semiconductor applications are essential to many emerging technologies. Their distinctive chemical, physical, and electronic properties suggest potential applications in displays, lighting, sensors, lasers, and various other fields, generating significant interest in this area. Rare-earth and transition metal ion-doped zinc orthosilicate (Zn_2SiO_4) nanomaterials have gained considerable attention in the field of semiconductor phosphors. Zinc orthosilicate nanophosphors show significant potential in advanced materials as a highly adaptable luminescent substance due to the extensive multi-color spectrum achievable with various guest ions. This study synthesized homogeneous and nanostructured doped zinc orthosilicate phosphor powders using a sol–gel method to control the hydrolysis of zinc chloride and silicon alkoxide precursors. The chemical, structural, and electrical characteristics of synthesized zinc orthosilicate nanophosphors have been extensively examined using X-ray diffraction (XRD), inductively coupled plasma optical emission spectrometry (ICP-OES), field emission scanning electron microscopy (FE-SEM), Fourier transform infrared (FTIR), and impedance spectroscopy. The X-ray diffraction patterns of nanophosphors exhibit distinct sharp peaks, and the ICP-OES analysis verifies the presence of dopant ions within the matrix. Moreover, all synthesized nanophosphors exhibited a rhombohedral structure. Observations from FE-SEM images reveal small, round grains with spherical morphology and an average diameter of approximately 0.4 μm. The dielectric loss, dielectric constant, and alternating current (AC) conductivity properties have been analyzed as a function of frequency. The results indicate a strong dependence on the nature of the dopant ions. The exceptional electric and dielectric properties of doped zinc orthosilicate nanophosphors highlight their significant potential for various nano-scale high-k dielectric nano-transistor and high-energy capacitor applications.

Keywords – Dielectric constant, Electric conductivity, Nanophosphors, Sol-gel, Zinc orthosilicate.

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Assessing the effects of calcined red mud on the physical and mechanical properties of mortar

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Abstract – To efficiently utilize red mud in cement-based materials, this study employed high-temperature calcination to enhance the pozzolanic activity of red mud. Calcined RM was used as a partial replacement for cement in red mud-cement mortar. The study investigated the effects of varying amounts of calcined red mud (CRM) on the workability and mechanical properties of the mortar. To concretize this objective, two groups of mixes were studied; in the first group, mortar was made only with 100% of cement (reference mortar). In the second group, mortar was made with partial replacemnt of cement by 5% and 10% of CM. All these mixtures were tested at fresh state for workabilty and at hardened state for measure compressive strength. The results showed that replacing up to 10% of cement with CRM reduced workability but significantly enhanced compressive strength.

Keywords – Calcination, *calcined red mud CRM, cement, mortar, workability, compressive strength.*

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Effects of recycled red mud as partial replacemt cement on durability properties of mortar: Review

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Abstract – valorization of waste red mud in cement as supplementary cementitious materials has become an opportunity. Some advantages are red mud waste recycling, consumption reduction of natural resources and improvement of cement properties. This paper presents a review on addition of recycled red mud to the cement and effect on their properties. Some international researches were selected from scientific peer-reviewed journals. The important items analyzed were red mud characteristics, recycling methods and cement performance. The last item includes physical and mechanical properties. Although the red mud negatively affected some properties, this paper focuses on the variables that mitigate these effects. As conclusion, application of red mud waste would be useful on both, technical and environmental dimensions and this paper could be used as a helpful tool for studying and designing mortar composites with red mud.

Keywords – Cement, red mud, mortar, absorption immersion and porosité.

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Computational designing of Vander Waals heterojunctions of $BiTaO_4/gC_3N_4$ and $AlTaO_4/gC_3N_4$ as an efficient degradation photocatalyst

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Abstract – This study explores the van der Waals heterojunctions formed by combining graphitic carbon nitride (g-C_3N_4) with tantalates ($BiTaO_4$ and $AlTaO_4$) through first-principles calculations. The most stable configurations of these heterojunctions were determined via geometry optimization, with structural analysis highlighting key interfacial interactions. Electronic structure analysis, including density of states (DOS) and partial density of states (PDOS), provided insights into electronic distribution and charge carrier dynamics. Band structure analysis indicated appropriate band gaps for photocatalytic applications, while optical properties, such as absorption spectra, demonstrated strong UV-visible light absorption. A comparative analysis of the heterojunctions emphasized the influence of tantalate composition on photocatalytic performance, particularly with regard to charge transfer pathways and charge separation efficiency at the interfaces. This work offers valuable insights into the electronic and optical properties of tantalate/g-C_3N_4 heterojunctions, contributing to the rational design of photocatalysts for environmental pollutant degradation.

Keywords – First principles study, Van der Waals heterojunctions, Computational material science, Tantalate based photocatalysts, Band gap engineering

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Çelik Kolon Kiriş Birleşim Bölgelerinde Kullanılacak Çelik Manşon Yönteminin T-Elemanlı Bağlantılarında Uygulanması

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Özet – Bulonlu kolon–kiriş birleşimleri çelik yapılarda sıklıkla kullanılan bir birleşim şeklidir. Bu bağlantı şekli çelik çerçeve yapısında kolon ve kiriş arasındaki kesme kuvveti, eksenel kuvvet ve moment aktarımında önemli rol oynamakla birlikte sisteme yüksek süneklik sağlamış olur. Özellikle çelik birleşim bölgeleri için bir dönüm noktası olan Northride depreminden sonra kolon-kiriş birleşim bölgelerinin sünekliliğini arttırmak için de çeşitli bağlantı konfigrasyonları geliştirilmiştir. Enerji sönümleme yöntemlerinden biri olan bu yaklaşım, bulonlu bağlantılarda yük yolunu keserek kolon-kiriş birleşim bölgesinde alın lehvası ile bulon somunu arasına belirli bir genlik ve kalınlığa sahip çelik bir manşon yerleştirilmesi yöntemine dayanmaktadır. Bulonlu birleşim bölgelerini modellemek için Eurocode-3 de önerilen eşdeğer T-Eleman yöntemi ile oluşturulan modelleri, deneysel veriler ile inceleyen bir çalışmayı baz alarak sonlu elemanlar yöntemi ile bu çalışmanın analizleri gerçekleştirilmiştir. Eksenel çekme kuvvetine maruz bırakılan T-Eleman bağlantılarında bulon gövdesine yerleştirilen çelik manşon elemanının enerji sönümlemeye ve yük kapasitesine faydası analiz edilmiştir. Bu analizlerde bağlantıların toplam uzamalarında önemli artışlar elde edilmiştir. Bu çalışmada önerilen yenilikçi yöntem ile bulonlu bağlantıların elastik bölgedeki performansında olumsuz bir etkiye sahip olmadan, enerji sönümleme kapasitesi ve sünek davranış özelliği önemli ölçüde arttırılmıştır. Önerilen bağlantı modeli, deprem etkisi altında yapısal bir sönümleyici olarak kullanılarak özellikle deprem kuşağı altında bulunan ülkemizde çelik yapıların birleşim bölgelerinde yapısal performansın daha da iyileştirilmesine katkı sağlayacaktır.

Anahtar Kelimeler – Çelik Yapılar, Bulonlu Birleşimler, Çelik Manşon, T-Eleman, Süneklilik

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Farklı Isıl İşlem Parametrelerinin 6xxx Serisi Alaşımların Sertlik Değerleri Üzerindeki Etkilerinin İncelenmesi

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Özet **–** 6xxx serisi alüminyum alaşımları, yüksek mukavemet, korozyon direnci ve iyi işlenebilirlik özellikleri sayesinde otomotiv, inşaat ve havacılık sektörlerinde geniş kullanım alanına sahiptir. Bu serinin ana alaşım elementleri magnezyum ve silisyumdur. Bu alaşımların mekanik özellikleri çökelme sertleşmesi işlemi ile yüksek seviyelere çıkartılabilir. Solüsyona alma, su verme ve yaşlandırma adımlarından oluşan çökelme sertleştirmesi işlemi sırasında solüsyona alma adımında ve Mg ve Si elementlerini katı çözeltiye alır, hızlı soğutma ile burada hapsedilip yaşlandırma sırasında Mg_2Si gibi sert çökeltilerin homojen bir şekilde oluşumunu sağlanır. Burada her adımda kullanılan parametreler kritik öneme sahiptir. Solüsyona alma adımındaki sıcaklık ve süre, su verme sırasındaki soğutma hızı, yapay yaşlandırma adımındaki sıcaklık, bekleme süresi gibi parametreler ürünün final özelliklerini doğrudan etkilemektedir.

Gerçekleştirilen çalışmada aynı ekstrüzyon parametreleri kullanılarak üretilen 6xxx serisi alaşımı profillerden alınan numunelere farklı sürelerde solüsyona alma, farklı hızlarda soğutma ve yapay yaşlandırma işlemleri uygulanmıştır. Bu işlemlerin sonucunda kullanılan parametrelerin mekanik özellikler üzerindeki etkileri yapılan brinell sertlik ölçümleriyle karşılaştırmalı olarak incelenmiştir.

Anahtar Kelimeler – 6xxx serisi alüminyum alaşımları, Çökelme sertleşmesi, yaşlandırma, mikro yapı, mekanik özellikler.

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AA6060 ve AA6082 Malzemelerde Isıl İşlemin Sertlik ve Eğme Mukavemetine Etkisinin İncelenmesi

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Özet – Alüminyum, yer kabuğunda en yaygın bulunan üçüncü element olup, demir-çelikten sonra en çok üretilen ve kullanılan metaldir. Doğada saf halde bulunmayan alüminyum, boksit cevherinden elde edilir. Boksit, Bayer Prosesi adı verilen kimyasal bir işlemle alüminaya (Al_2O_3) dönüştürülür. Ardından, alümina elektroliz yoluyla yüksek akım altında oksit ve alüminyum olarak ayrılır, böylece saf birincil alüminyum elde edilir. Alaşım elementleriyle alaşımlandırılan alüminyum ve alaşımları, şekillendirilebilirliği iyi, korozyon direnci yüksek, iyi mekanik özelliğin yanı sıra sağladığı düşük yoğunlukla beraber başlıca havacılık ve otomotiv sektöründe öncü olmaktadır. Bu sektörlerin yanında gıda ve ambalaj, mimarı ve inşaat, beyaz eşya sektörü gibi pek çok sektörde de kullanılmaktadır. Alüminyum profiller sıcak şekillendirme yöntemi olan ekstrüzyon yöntemiyle üretilmektedir. Bu proseste 6XXX serisi ana alaşım elementi Mg ve Si elementi olan alüminyum alaşımları sıklıkla kullanılmaktadır. Kullanılan profiller çeşitli sektörlerde farklı beklentileri olabilmektedir ve bu beklentiler neticelerinde spesifik mekaniksel özellikler beklenmektedir. Bu mekanik özellikler yapılan üretim şekilleri, kullanılan üretim ekipmanları ve ısıl işlem uygulamaları gibi özelliklerle geliştirilebilir.

Yapılan çalışmada AA6060 ve AA6082 alüminyum alaşımlarından eğme mukavemeti ve sertlik testi için numuneler çıkarılmıştır. Bu numuneleri kül fırını kullanılarak solüsyona alma ısıl işlemi uygulanmıştır. Akabinde 1 saat, 5 saat ve 15 saat olacak şekilde yapay yaşlandırma işlemi uygulanmıştır ve bu numunelere sertlik testi ve Shimadzu AG-IS 250 kN universal mekanik test cihazında eğme testi yapılmıştır. Bu testlerle, malzemenin ısıl işleme bağlı olarak sertlik-eğme açısı arasındaki ilişki incelenmeye çalışılmıştır.

Anahtar Kelimeler – Alüminyum, Eğme Mukavemeti, Sertlik, Isıl İşlem, 6XXX.

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Design of Hexagonal-Shaped Artificial Magnetic Conductor for Gain and Directivity Enhancement

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Abstract **–** This study presents the design and evaluation of a hexagon-shaped Artificial Magnetic Conductor (AMC) to enhance the gain and directivity of a microstrip patch antenna. The AMC was positioned under the antenna to assess its impact on various performance parameters. Experimental results demonstrated an improvement in gain and directivity with adding the AMC. Initially, the microstrip patch antenna exhibited a gain of 7.454 dBi and a directivity of 11.22 dBi. After integrating the hexagonal AMC, these values increased to 7.936 dBi for gain and 17.29 dBi for directivity. These findings indicate that a hexagon-shaped AMC can effectively enhance the efficiency of microstrip patch antennas, making it a promising solution for applications that require improved antenna performance.

Keywords – AMC, microstrip patch antenna, gain, directivity, hexagonal shape.

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Advancing Diabetic Retinopathy Detection Through Deep Learning

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Abstract – Deep learning plays a significant role in enhancing and structuring various aspects of our daily lives, particularly in the realm of healthcare. Recently, healthcare practitioners have begun to implement these advanced techniques in the management of numerous conditions, including diabetic retinopathy, due to their robust data analysis capabilities. In this dissertation, we present a system for the detection and classification of diabetic retinopathy, along with an assessment of its severity, utilizing deep learning models. For the evaluation of this system, we employed the APTOS2019 dataset from Kaggle, which comprises high-resolution images of the retina. Furthermore, we adopted a protocol akin to that utilized by medical professionals to systematically assess the condition and severity of diabetic retinopathy. Our experiments were conducted using five distinct models: InceptionV3, Xception, and MobileNetV2. The results achieved demonstrate a high level of accuracy, indicating the effectiveness of our approach.

Keywords – diabetic retinopathy (DR), image classification, deep learning, artificial intelligence, medical imaging.

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Synthesis of Graphitic Nitride modified Maghnite Clay Catalyst for Efficient Dye Degradation via Impregnation Calcination Method

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Abstract – Maghnite clay, a natural Algerian clay rich in montmorillonite, has been widely recognized for its excellent adsorption properties. However, its photocatalytic activity is limited. To enhance its photocatalytic performance, a novel g-C3N4-Maghnite composite catalyst was synthesized through a facile impregnation and calcination method. Graphitic carbon nitride (g-C3N4), a promising photocatalyst with unique electronic and chemical properties, was incorporated into the Maghnite clay matrix to improve light absorption and charge carrier separation.

Characterization techniques, including BET, FTIR, XRD, and UV-Vis DRS, confirmed the successful synthesis of the composite catalyst with a high surface area, well-defined crystalline structure, and enhanced visible light absorption. The catalytic activity of the g-C3N4-Maghnite composite was evaluated for the degradation of acetaminophen, a common pharmaceutical pollutant, under simulated solar light irradiation. Impressively, the composite catalyst achieved a 97% degradation rate within 40 minutes.

This study demonstrates the synergistic effect of Maghnite clay and g-C3N4 in enhancing photocatalytic activity. The composite catalyst offers a promising and sustainable approach for the degradation of organic pollutants in wastewater treatment.

Keywords – Maghnite clay, Graphitic carbon nitride (g-C3N4), Composite Catalyst, Photocatalysis, Acetaminophen degradation

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Photocatalytic properties of pure and (Eu)-doped ZnO aerogels elaborated by a modified sol gel process

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Abstract – Here we report on the structural and optical properties of pure and Eu-doped (0.5 to 5% at.) ZnO aerogels nanostructures (ZnO) synthesized by sol-gel associated with drying at supercritical conditions of isopropanol (254 °C, 54 bars). The samples were investigated using X-ray diffraction (XRD), SEM, UV-visible spectroscopy, FTIR and photoluminescence (PL). XRD studies exhibit the formation of a high crystal quality ZnO wurtzite hexagonal structure. The UV-visible measurements point out that the absorption intensity and the band gap energy increase after Eu-doping. FTIR analysis confirms the formation of ZnO phase and reveals a shift toward longer wavenumber of the Zn-O absorption band after Eu -doping. SEM images show that Eu3+ ions lead to change the morphology of ZnO crystalline from pastille to sphere. PL measurements reveal a decrease of UV luminescence intensity and an increase of the visible one due to Eu-doping. The photocatalytic degradation of methylene blue (MB) under UV light irradiation is significantly enhanced with the introduction of Eu3+ ions into the structure. The complete degradation of MB (94%) was obtained with an optimum of 0.5 at.% after 85min UV irradiation.

Keywords –ZnO, Eu-doping, supercritical isopropanol, structure, morphology, photoluminescence

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Improving SDN Performance Using Network Coding: A Quantitative Analysis

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Abstract – Software Defined Networking or SDN is an architectural approach to managing the network where the control and forwarding are different planes that are controlled through an application interface. Nevertheless, SDN's traditional renditions incorporate a few limitations such as packet drops, higher latency and suboptimal resource consumption especially in conditions of high volatility. These problems can reduce the benefits of SDN especially in areas that need large bandwidth and dependable networks. Network coding is a promising technology to encode and transmit the data packets as combinations and thus offers unique solutions to these problems. In communications, network coding, supports direct and efficient transmission and interactivities, smart data retrieval through the SDN-based networks enhancing both throughput, decreased latency, and effective fault tolerance. Further, it supports fine-tuning of the load distribution process by responding to network traffic situations and improving general networking capacity. In this paper, we investigate the applicability of applying network coding in SDN solutions and evaluate their effects. The evaluating shows that the network coding implemented reduces the value of packet loss and increases the value of delivery of data. This approach, allows for a 42.8% throughputs improvement boost under high load and yet does not incur high latency and is very fault tolerant. These results prove the possibility of network coding as a powerful addition for SDN and indicate its applicability in the future network structures.

Keywords – Software Defined Networks, Network Coding, Throughput, Latency, Packet Loss

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The impact of waste plastic on the durability evaluation of cementitious materials for stabilizing weak soils

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Abstract – Stabilizing problematic and weak soils is a common practice in geotechnical and pavement engineering. It involves adding a small quantity of cementitious materials to the soil to enhance its mechanical characteristics. Numerous studies have shown that lime and cement treatment can significantly alter the physical and mechanical properties of compacted soils, including reduced settlement potential, higher shear strength, increased modulus of elasticity, and changes to compaction parameters. Furthermore, the reusability of plastic waste is a promising solution for reducing atmospheric pollution. In this investigation, a laboratory experiment on stabilizing weak soil with different additions of cementitious materials and plastic waste was carried out by a series of tests, including Proctor compaction tests, optimal dry density, CBR tests, and unconfined compressive strength tests (UCS). The aim was to evaluate the effectiveness of the cementitious materials treatment of soil with waste plastic and find the optimal amount for practical design. The conclusion drawn was that adding waste plastic and a modest amount of lime and cement to the soil is a suitable method for stabilizing road construction's sub-base layer, with significant practical implications for the field. This research provides valuable insights for engineers, researchers, and students in geotechnical and environmental engineering, informing them about effective soil stabilization techniques and their environmental benefits.

Keywords – Stabilization, Weak soil, Waste plastic, Lime, Cement

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Sürekli Dik Döküm – Dövme Yöntemi ile Üretilmiş Alüminyum Süspansiyon Parçasının Mikroyapı Ve Mekanik Özelliklerinin İncelenmesi

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Özet – Günümüzde otomotiv sektörü hem maliyetlerin azaltılması hem de ağırlık azaltma ihtiyacı nedeniyle sürekli olarak geliştirme, iyileştirme ve yenilikçi olmayı hedeflemektedir. Bu yüzden araçların süspansiyon sistemlerinde konfordan ödün vermeden en hafif parçalar ile güvenli bir şekilde yol tutuşu sağlanması hedeflenmektedir. Bu amaçla mevcut üretim tekniklerinden farklı olarak dövme öncesinde ön şekli alüminyum sürekli dik döküm üretim yöntemi ile elde edilmiş yeni bir üretim süreci olan sürekli dik döküm – dövme ile alüminyum süspansiyon parçası olan salıncak üretimi gerçekleştirilmiştir. Bu yenilikçi üretim tekniğinde ön şekli alüminyum sürekli dik döküm ile elde edilen parça sıcak dövme işlemi ile nihai ölçülerine getirilmiştir. Mevcut süreçte ise alüminyum ikiz bantlı dökümden dövme ile elde edilen salıncak parçasının alüminyum sürekli dik döküm dövme ile elde edilen salıncak parçasının metalografik ve mekanik yönden karşılaştırması yapılmıştır. Karşılaştırma yapmak üzere mikro yapı analizi, sertlik analizi, çekme testi ve mafsal çıkma testi gerçekleştirilmiştir. Mevcut üretim yöntemine yakın özellikler gösteren yenilikçi alüminyum sürekli dik döküm dövme salıncak parçasının kullanılabilirliği ortaya konmuştur. Alüminyum salıncak süspansiyon parçası üretiminde ulusal çapta ilk defa gerçekleştirilen bu üretim yönteminin uluslararası arenada etkin katma değeri yüksek ürün olarak değerlendirileceği düşünülmektedir.

Anahtar Kelimeler – Süspansiyon parçası, sürekli dik döküm, alüminyum, alüminyum dövme, alüminyum döküm.

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Comparative Analysis of Integral Backstepping and Perturb & Observe MPPT Techniques for Enhanced Efficiency and Stability in Grid-Connected Photovoltaic Systems

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Abstract Photovoltaic (PV) systems are key enablers of the global transition to renewable energy, providing clean and sustainable electricity. However, their energy conversion efficiency is highly sensitive to environmental variations such as changes in solar irradiance and temperature. To achieve optimal power extraction, Maximum Power Point Tracking (MPPT) techniques are critical. The Perturb and Observe (P&O) algorithm is a widely adopted solution due to its straightforward implementation, but it suffers from inherent limitations, including steady-state power oscillations near the Maximum Power Point (MPP) and suboptimal performance under rapidly changing conditions.

This research presents a comparative study between the conventional P&O method and an enhanced Integral Backstepping control approach, focusing on their effectiveness in MPPT for PV systems. A grid-connected single-phase PV system is modeled, including a PV array, a boost converter, and an inverter controlled in the synchronous reference frame (dq-frame). The comparative analysis evaluates both strategies under diverse environmental scenarios in terms of tracking efficiency, stability, and response time.

The findings demonstrate that the Integral Backstepping approach significantly outperforms P&O by achieving higher efficiency, faster dynamic response, and improved stability under varying conditions. This study underscores the potential of advanced MPPT algorithms combined with robust inverter control for enhancing the performance and grid integration of PV systems.

Keywords Photovoltaic Systems, Maximum Power Point Tracking (MPPT), Integral Backstepping, Control Perturb and Observe (P&O),Grid-Connected Inverter.

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Enhanced Performance of Single-Phase Transformerless Grid-Connected PV Systems Using PSO-Based MPPT Algorithm

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Abstract The adoption of single-phase transformerless grid-connected photovoltaic (PV) systems has grown significantly in recent years due to their compact size, reduced weight, and improved efficiency. These systems require efficient control strategies to maximize energy extraction and ensure reliable operation under varying environmental conditions. This study introduces a Particle Swarm Optimization (PSO)-based Maximum Power Point Tracking (MPPT) algorithm to enhance the performance of such PV systems. The proposed method dynamically adjusts the boost converter's duty cycle to regulate the output voltage of the solar panel, enabling maximum power extraction regardless of changes in solar irradiance or temperature.

The PSO algorithm leverages a population-based optimization approach to swiftly locate the maximum power point (MPP), offering advantages such as a rapid response time and minimal steady-state oscillations. The performance of the proposed PSO-based MPPT scheme is validated through comprehensive simulations in MATLAB/Simulink under various operating scenarios. Key performance metrics, including tracking speed, stability, and energy conversion efficiency, are analyzed and compared.

Keywords photovoltaic (PV) system, MPPT, pso algorithm ,boost, microgrid.

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GENERATING FUNCTIONS OF BINARY PRODUCTS OF THIRD-ORDER RECURRENCE WITH SOME KNOWN NUMBERS

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Abstract – In this paper, we give some new generating functions for the binary products of third-order recurrence with some known numbers by making use of the symmetrizing endomorphism operators $\delta_{e_1e_2e_3}$ to the series $\sum_{n=0}^{\infty} S(A_3)e_1z^n$.

Keywords – Symmetric functions, Generating functions, Tribonacci numbers, Padovan numbers, Perin number.

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Thermal Performance Assessment Analysis of Miniature Cooling Device

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Abstract – The present study is about determining the thermal performance of a miniature cooling device by using single phase magnetic fluid. COMSOL MultiPhysics, an FEA solver was used for conducting the numerical analysis. The thermal performance of the device was assessed by monitoring the temperature at different points along the closed loop by employing temperature probes. Time-varying temperature contours were also plotted that confirm the movement of the magnetic fluid through the loop. It was also concluded from the numerical study that in order to amplify the effect of thermo-magnetic convection, magnetic fluid should be heated in vicinity to Curie point of the fluid, highlighting the synergy between temperature gradient and magnetic field. Magnetic fluid based cooling system is totally passive in nature as it doesn't require any external force to circulate the fluid. Such systems can thus address the problem of heat dissipation in an effective way and provide a potential solution for thermal management of such devices.

Keywords – Thermal Performance, Magnetic Fluid, COMSOL MultiPhysics, Thermo-magnetic convection, Cooling system

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TÜRK İŞ HUKUKUNDA ANALIK İZİNLERİ

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Özet – Anayasanın 50/2. maddesine göre, kadınlar çalışma şartları bakımından özel olarak korunurlar. Kadınlara sağlanan en önemli koruma ise gebelik ve doğum sonrasına ilişkindir. Bu kapsamda kadın işçilere özellikle gebelik ve doğum sonrası dönemde çalışmalarının yasak olduğu süreler öngörülmüş, gebelik ve emzirme süresince çalışma süreleri sınırlandırılmış ve gece çalışma yasağı getirilmiştir. Böylelikle kadın işçinin hem annelik görevini yerine getirebilmesi hem de işinin korunması amaçlanmıştır. 29.1.2016 tarih ve 6663sayılı Kanun ile Türk Hukukunda kadın işçilerin doğum hallerine ilişkin yeni düzenlemeler öngörülmüştür. Kanun ile analık haline ilişkin olarak kadın ve erkek işçilere bazı ek izin hakları tanınmıştır. Düzenlemeye göre, kadın işçi talep etmesi halinde analık izninin devamı süresince çocuk sayısına bağlı olarak yüz seksen güne kadar haftalık çalışma süresinin yarısına karşılık gelen sürelerle ücretsiz izne ayrılabilecektir. 6663 sayılı Kanun, çalışma süresinin yarısı kadar ücretsiz izin hakkını kullanan kadın işçiye yarım çalışma ödeneği verilebilmesi için İşsizlik Sigortası Kanununa bir hüküm eklemiştir. Buna göre, işçiye, haftalık çalışma süresinin yarısı kadar verilen ücretsiz izin süresince doğum ve evlat edinme sonrası yarım çalışma ödeneği ödenir. 6663 sayılı Kanun ile ayrıca analık haline özgü kısmi çalışma imkânı sağlanmıştır. Düzenlemeye göre analık hali izinlerinin bitiminden sonra ya da üç yaşını doldurmamış çocuğun fiilen teslim edildiği tarihten itibaren çocuğun mecburi ilköğretim çağına kadar ana-babadan birisi kısmi süreli çalışma hakkını kullanabilecektir. Bildirinin amacı kadın işçilere tanınan analık izinlerinin 2010/18 EU sayılı Avrupa Birliği Yönergesi hükümleri çerçevesinde değerlendirmektir.

Anahtar Kelimeler – Doğum izni, Türk Hukuku, Kadın İşçi, Emzirme İzni, Yarım Çalışma

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AMATÖR SENDİKA YÖNETİCİSİNİN İŞ GÜVENCESİ

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Özet – 6356 sayılı Sendikalar ve Toplu İş Sözleşmesi Kanununa göre yönetici kavramı "kuruluşun ve şubenin yönetim kurulu üyelerini" ifade eder (STİSK.2/1,i). Kuruluş kavramı ise sendika ve konfederasyonları kapsayan üst kavramdır (STİSK.2/1,g). Kuruluşların yönetim kurulu üyeleri ise kuruluşların genel kurulları tarafından seçilir. 2821 sayılı Sendikalar Kanununda amatör sendika yöneticilerinin iş güvencesine ilişkin özel bir düzenleme getirmemişti. Bu nedenle amatör sendika yöneticileri de sendika üyelerinin sahip olduğu güvenceye sahipti. 6331 sayılı Sendikalar ve Toplu İş Sözleşmesi Kanunu amatör sendika yöneticileri hakkında da işyeri sendika temsilcilerinin güvencesinin uygulanacağını hüküm altına almış ve amatör sendika yöneticilerinin iş güvencesine ilişkin önemli bir adım atmıştır. Bu bildiride özellikle amatör sendika yöneticisi kavramı üzerinde durulacak ve işyeri sendika temsilcisinin güvencesi ile bağlantılı olarak amatör sendika yöneticisinin iş güvencesi ele alınacaktır.

Anahtar Kelimeler – Sendika Yöneticiliği, Amatör Sendika Yöneticisi, Profesyonel Sendika Yöneticisi, İş Güvencesi, İşyeri Sendika Temsilciliği

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Optimization of Quantum Dot-Based Photovoltaic Cells: Tailoring Intermediate Bands for Enhanced Efficiency

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Abstract – Quantum dot-based photovoltaic cells, particularly those incorporating quantum dots in the intrinsic region of the PIN junction, are among the most promising technologies for enhancing solar energy conversion efficiency. These cells, as part of the third generation of solar technologies, aim to achieve high efficiency at a reduced cost. In this study, we explore two different quantum dot configurations within the intrinsic region of the PIN junction: PbTe/CdTe and PbSe/ZnTe for the first combination, and InN/GaN for the second. The key to enhancing efficiency lies in controlling the intermediate band, which can be tailored by adjusting the size of the quantum dots and the distance between them.

The primary goal of this work is to determine the optimal parameters, such as the quantum dot size and inter-dot distance, that lead to maximum solar cell efficiency. To achieve this, the energy levels of the quantum dots are calculated by modeling the system as 3D confined particles, including both electrons and holes. The energy dispersion relations are derived by solving the Schrödinger equation and applying the Kronig-Penney model. This approach allows for the precise determination of the intermediate band's position and width. By optimizing these parameters, we aim to enhance the performance of quantum dot-based solar cells. The findings of this study provide valuable insights for the design of high-performance, cost-effective photovoltaic devices, contributing to the future of advanced solar cell technologies.

Keywords – Quantum dots, photovoltaic cells, PIN junction, intermediate band, solar cell efficiency, PbTe/CdTe, PbSe/ZnTe, InN/GaN, quantum dot size, inter-dot distance, Schrödinger equation, Kronig-Penney model, energy dispersion, 3D confined particles, solar energy conversion.

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Progress and Challenges in InxGa1−xN-Based Solar Cells for High-Efficiency Photovoltaics

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Abstract – Solar cells have become a promising source of renewable, carbon-free energy, providing a solution to the global energy crisis and climate change. Recent advancements in conventional III–V semiconductor materials have led to photovoltaic cells with energy conversion efficiencies exceeding 40%. The revision of the InN bandgap to a narrower value has significantly expanded the bandgap range of the group III-nitride alloy system, from 0.64 eV for InN to 3.4 eV for GaN, and up to 6.2 eV for AlN. This development opens up various new applications, particularly for high-efficiency solar cells.

The tunable bandgap, high radiation resistance, and strong absorption properties of the InxGa1−xN material system make it a promising candidate for next-generation photovoltaic systems. In recent years, significant interest has emerged in InxGa1−xN-based solar cells, positioning them as a potential breakthrough in high-performance solar technologies. When compared to conventional silicon and other III–V solar cells, InxGa1−xN materials offer significant advantages for achieving higher efficiency.

Despite the promising prospects, considerable challenges remain in the development of InxGa1−xN-based solar cells. Significant progress has been made, but obstacles such as material quality, device design, and manufacturing processes still need to be addressed to achieve optimal performance. This review summarizes the current state of InxGa1−xN-based solar cells, discussing the key challenges and recent advancements. It also explores ongoing efforts to overcome these challenges and improve the efficiency of these emerging photovoltaic technologies.

Keywords – Solar cells, InxGa1−xN, photovoltaic materials, energy conversion efficiency, III–V semiconductors, tunable bandgap, radiation resistance, absorption properties, high-efficiency solar cells, semiconductor alloys, material quality, device design, next-generation photovoltaics..

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Performance Analysis of a Single-Slope Solar Still for Brackish Water Desalination in Biskra, Southern Algeria

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Abstract – Seawater and brackish water desalination have emerged as key research priorities globally. Solar distillation presents a sustainable, simple, and cost-effective solution to enhance water resources, particularly in regions facing water scarcity. This study focuses on developing a single-slope solar still for use in the Biskra semi-arid region of southern Algeria (34.85° N, 5.7° E). The distiller is constructed with an EPVC structure, featuring an aluminum absorber basin with an area of 0.4 m² and a depth of 5 mm, and a glass cover inclined at 34.5°. The study investigates distilled water production during the late sunny autumn, analyzing the effects of different water depths in the basin and various physical parameters, including solar radiation, humidity (internal and external), wind speed, and the internal and external temperatures of the distiller. Results indicate that the distillate production rate increases with a smaller temperature difference between the water and the glass cover. Wind and climatic variations also impact production by reducing the diffuse solar energy received by the brackish water. The average yield of distilled water was found to be 1.25 L/m²/day.

Keywords – Desalination, solar still, Desalination, distillation, solar energy, Brackish water

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Yapay Sinir Ağlarının BIST Fiyat Tahminlemesinde Kullanılması

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Özet – Borsada fiyat tahminleri yatırımcı, şirket ve ekonomi açısından son derece önemlidir. Borsa fiyat tahmini yatırım kararlarını destekler, piyasalara güven verir, şirketler için stratejik planlamada yardımcı olur, ekonomi yönetiminin sağlıklı işlemesini sağlar. Günümüzde borsa fiyat tahminleri yapay zekâ ve makine öğretimi gibi ileri tahmin metotları ile yapıldığında bunun finans sektörüne entegrasyonu önemli olmaktadır. Doğru fiyat tahminleri spekülatif hareketlerin azalmasına ve piyasanın istikrarlı olmasına yardımcı olur. Ayrıca doğru fiyat tahminleri ekonomik kriz, büyüme gibi makroekonomik olayları önceden tahmin etme konusunda bilgiler verir. Yatırımcılar hisse senedi fiyatlarındaki potansiyel değişimleri öngörerek riskleri minimize eder.

Bu çalışmada İstanbul Borsasında 2 yıllık veriler (2022-2023 yılları) kullanılarak BIST-100 ve BIST-30 borsa açılış, en düşük ve yüksek fiyatları, hacmi ve değişim yüzdesi yapay sinir ağlarında kullanılarak kapanış fiyatları tahminleme modeli oluşturulmuştur. Bu model ile veri setinin verimli kullanılması ve modelin genelleme yeteneğinin daha iyi değerlendirilmesi sağlanmıştır. K-Katlamalı Çapraz Doğrulama (K-Fold Cross-Validation) tekniği, makine öğrenimi modellerini değerlendirmek için kullanılan doğrulama tekniklerinden biridir ve bu çalışmada üretilen modelin başarısını değerlendirmek için kullanılmıştır.

Geliştirilen model 500 günlük verilere uygulanmıştır. Deneysel çalışmalar sonucunda, Ortalama Kare Hata (Average Mean Squared Error) 10163,68, Ortalama Mutlak Hata (Average Mean Absolute Error) 33,18, Ortalama Korelasyon Katsayısı (Average R) 0,998, Ortalama Doğruluk (Average Accuracy) 0,994, Ortalama Kesinlik (Average Precision) 0,995, Ortalama Duyarlılık (Average Sensitivity) 0,993 şeklinde bulunmuştur. Algoritmanın çalışma süresi (Elapsed Time) 53,18 saniye olarak hesaplanmıştır. Bu istatistiksel sonuçlar, modelin başarılı olduğunu onaylamaktadır.

Anahtar Kelimeler – Borsa fiyat tahmini, Yapay sinir ağları, K-Katlamalı Çapraz Doğrulama (K-Fold Cross-Validation), Ortalama Kare Hata (Mean Squared Error), BIST-100 ve BIST-30

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Addressing global water scarcity: Developing innovative materials for water purification

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Abstract **–** In recent years, new and highly promising porous materials known as Metal-Organic Frameworks (MOFs) or coordination polymers have been discovered and used for dye adsorption. These MOFs possess unique characteristics such as high porosity, large specific surface area, and significant pore volume and size. In our study, we focused on evaluating the MOF UIO-66-NH2 for the adsorption of methylene blue. The adsorption capacity increases with the amount of MOF, achieving a maximum yield of 76% with 15 mg of adsorbent. The optimal conditions for methylene blue adsorption with UIO-66-NH2 were found to be at an initial dye concentration of 10 mg/L and a pH of 11. Kinetic modeling indicated that the adsorption process follows a pseudo-second-order kinetic model. Langmuir, Freundlich, and Temkin adsorption isotherms were applied to the equilibrium experimental data, and the Langmuir model was determined to be the most appropriate. The thermodynamic analysis showed that the adsorption process is exothermic and spontaneous, with a negative ΔG° at various temperatures. These results demonstrate that UIO-66-NH2 exhibits excellent efficiency in the adsorption of methylene blue.

Keywords – Metal-Organic Frameworks (MOFs), Coordination polymers, Porous materials, Adsorption, Methylene blue.

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Türkçe Müşteri Yorumları Üzerinden Duygu Analizi: Metin Madenciliği ve Makine Öğrenimi Yaklaşımı

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Özet – Bu çalışma, Türkçe müşteri yorumlarının duygu analizi için bir çerçeve sunmaktadır. HepsiBurada platformundan alınan veri seti üzerinde metin madenciliği ve doğal dil işleme teknikleri uygulanmıştır. Metinler temizlenmiş, kelime köklerine indirgenmiş ve Terim Frekansı-Ters Doküman Frekansı (TF-IDF) yöntemiyle sayısal formata dönüştürülmüştür. Analiz için Multinomial Naive Bayes (MNB) algoritması kullanılmış ve %83.5 doğruluk oranına ulaşılmıştır. Elde edilen sonuçlar, Türkçe doğal dil işleme ve metin analizi alanında önemli katkılar sağlamaktadır.

Duygu Analizi, Türkçe Doğal Dil İşleme, TF-IDF, Multinomial Naive Bayes, Metin Madenciliği, Müşteri Yorumları

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Misconceptions about visual perceptual relationships in early childhood: Spatial relationships, spatial thinking, and spatial ability

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Summary – Early childhood education is a process in which the child develops every day and this development progresses in multiple ways. Since it is the period when the child's development is the fastest, it has been suggested that the educational activities carried out during this period should be development-based (Senemoğlu, 2012). The development-based education approach refers to the planning of education by taking into account the developmental characteristics of the child's age stage, the child's readiness, interest and needs. In the literature, instead of the concept of spatial ability, which is directly related to preschool education, the terms spatial visualization, visual-spatial ability, spatial comprehension ability and, rarely, spatial relationship instead of spatial relationship are used interchangeably (Akt. McGee, 1979:21; Lohman, 1993). It is anticipated that the incorrect use of these concepts may threaten the cumulative progress of science and cause incorrect information to be included in the literature. In this context, the concepts of spatial perception, ability and relationship (with their sub-concepts) included in visual perception studies, which are very important for the cognitive development of preschool children, were examined in detail with their distinguishing aspects in the relevant research. As a result; based on literature studies, it was determined that while the concepts of spatial ability and spatial perception, which support visual perception in the preschool period, are suitable for preschool education, spatial relationships, which require higher cognitive abilities and are based on reconstruction and prediction skills, are more suitable for children who have acquired abstract thinking skills and are over the preschool period. It is thought that describing why the concepts are preferred in line with the developmental characteristics of children, explaining the way they are included in the research and using the concepts in accordance with their purpose will prevent possible misconceptions in subsequent research.

Key Words – preschool education, cognitive development, visual perception, spatial ability, spatial thinking

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The effect of centrality on content store management in NDN

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Abstract – The increase in user-generated content on the Internet has recently led to the emergence of a new architecture called NDN. In this model, content is stored in the network's routers, which helps reduce traffic load and latency for users. NDN routers have larger caches than traditional buffers, allowing them to store named data chunks. This contributes to lowering data retrieval latency, as well as reducing network congestion. However, due to associate ed costs and the time required to access these caches, their capacity is limited. Therefore, it is essential to implement appropriate decision-making and replacement policies.

This article aims to explore the potential benefits of implementing a Content Store (CS) to enhance the performance of the NDN architecture. To achieve this, we utilize real topologies from network operators, incorporating NDN nodes of which only a few have a cache (Content Store). We then analyze various scenarios by varying the centrality of the Content Stores in a topology referred to as "Abilene Topology." Our goal is to evaluate performance metrics, focusing on the Average recovery hops and average retrieval delay. Through a series of in-depth simulation experiments conducted using NS-3 and its ndnSIM module, our study reveals that the Named Data Networking (NDN) architecture achieves optimal performance when nodes are located at the network's edge, close to end users. This finding is significant for network operators.

Keywords – Named Data Networks (NDN), Caching., content store (CS), ndnSim.

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DİJİTAL MEDYADA ENFORMASYON VE GÖRSEL İLETİŞİM

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Özet - Çalışma kapsamında "Dijital Medyada Enformasyon ve Görsel İletişim" alanındaki yeni gelişmeler ele almakta ve dijital çağın getirdiği yeniliklerin bu iki temel unsur üzerindeki etkileri incelemektedir. Dijital medya ortamında enformasyonun üretim, dağıtım ve tüketim süreçleri hızla değişirken, görsel iletişim giderek daha stratejik bir araç haline gelmiştir. Araştırma kapsamında, dijital medyada görsel içeriklerin bilgilendirme gücünü nasıl artırdığı ve enformasyonun daha geniş kitlelere etkili bir şekilde iletilmesinde nasıl kritik bir rol oynadığını vurgulamaktadır. Dijital platformların, görsel anlatıma dayalı içeriklerle enformasyonun üretim ve paylaşımını kolaylaştırdığı görülmektedir. Yeni teknolojiler ve yapay zeka destekli araçlar, tasarımcıların enformasyonu görselleştirme yeteneklerini genişletmiş, daha etkileşimli ve kullanıcı odaklı içerikler üretilmesini mümkün kılmıştır. Ayrıca, veri görselleştirme tekniklerindeki gelişmeler, karmaşık bilgilerin sade ve anlaşılır bir şekilde sunulmasını sağlamış, dijital medyada enformasyonun çok boyutlu olarak ele alınmasına olanak tanımıştır. Hem akademik çevreler hem de uygulayıcılar için dijital iletişimde görselliğin artan rolünü anlamak, daha etkili stratejiler geliştirmeleri açısından kritik bir öneme sahiptir. Bu çalışma, enformasyonun görselleştirilmesinin bilgi aktarımındaki verimliliği nasıl artırdığını ve görsel iletişimin dijital medya ortamındaki evrimini anlamak için kapsamlı bir bakış açısı sunmaktadır. Araştırma modeli olarak çalışmanın kuramsal çerçevesini oluşturan dijital medyada enformasyon ile görsel iletişim kavramına ilişkin ulusal ve uluslararası alanyazın taraması ile dijital medyadaki görsel iletişim üzerinde durulmuştur. Sağlık Bakanlığı web sitesi paylaşımları çalışma kapsamında değerlendirilmiştir.

Anahtar Kelimeler: Dijital Medya, Enformasyon, Görsel İletişim

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Hydromechanical behavior of unsaturated soils, Application to the behavior of BTC

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Abstract - Volume change in unsaturated soil can be attributed to two mechanisms. On the one hand, the compressibility of some soils is essentially controlled by the shear strength around particle contact points, and volume variations develop through relative displacement or sliding between particles. On the other hand, for some soils, compressibility is governed by the adsorption of double layers of water by negative pore water pressures. The microstructure of fine soils strongly influences both these mechanisms. Consequently, volume variations in fine soils are largely dependent on microstructure. As earth construction involves working on natural soils, pathologies can be observed in both the short and long term, and the drainage-wetting behavior of compacted soils is presented. Next, we look at mechanical behavior under controlled suction and its relationship with saturation zones. Application to a compressed earth brick is considered in the context of earth construction. The implications are ecological and economic.

Key words: Suction, unsaturated soil, compacted soil, behavior, earth construction.

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Stabilization of a silty clay soil by the addition of quicklime

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Abstract : The aim of this work is to strengthen a silty clay soil by adding quicklime, reducing its plasticity. The soil was extracted to a depth of around 6.0 meters. In this context, we assessed the soil's condition by carrying out identification tests in the laboratory. The soil in question is characterized by a high water content and an initial plasticity index of 32.24%, giving it a certain friability, which was observed during the laboratory tests. To improve the characteristics of this soil, we added lime in percentages of 2%, 4% and 6%. The results show that the plasticity index decreased to a value of 18.12%. The plasticity index continued to decrease with increasing lime percentage; for an addition of 4%, it took on a value of 14.05%, and finally, by adding 6% lime to the soil under consideration, a plasticity index of 12.62% was observed. We can conclude that the addition of this chemical improves the condition of the soil in question, as it lies in the low-plasticity silt zone. Lime causes grain irregularity, thus increasing soil stability. In conclusion, it can be stated that this method of mixing clay with lime, which is practical and cost-effective, improves the quality of the soil under consideration and encourages the valorization of local materials.

Key words : Stabilization, plasticity, lime

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Study of the hydraulic behavior of silty sand. Effect of relative density and modes of deposition

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Abstract : This work aims to evaluate how sample preparation, relative density and soil granularity affect the hydraulic behavior of sand. Tests were carried out on samples of three relative densities 20, 50 and 80% according to two preparation methods: dry pluviation (PS) and wet placement (PH) with a water content of 3%, using two reference soils from the Chlef region; Oued Chlef sand and Oued Rass sand. The (PS) method consists in continuously filling the mold by pouring dry sand in the rain. To obtain loose samples, the drop height is virtually zero. Medium-density samples are deposited in several layers that are lightly compacted, while for dense samples, the layers are perfectly packed to achieve the desired density. For mode (PH), pre-dried sand mixed with a small amount of water is placed in the mold with water content control. The soil is carefully placed in successive layers. The results show that hydraulic conductivity decreases with increasing relative density. This effect is most significant when moving from a relative density of 50 to 80%. Samples prepared using the (PH) mode have a higher hydraulic conductivity than those prepared using the (PS) mode. It was also found that Oued Rass sand had a higher hydraulic conductivity than Oued Chlef sand, due in particular to micro and macro-textural mineralogical characteristics (angularity, grain shape, texture, etc.).

Key words: *Sand, relative density, permeability, modes of deposition.*

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A phenomenological study on place attachment in 4-6 year old children experiencing disaster

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Summary – Disasters have been an inseparable and unchanging part of nature since the Big Bang, accompanying the development and change process of humanity (Kadıoğlu, 2011). Disasters are phenomena that question how individuals perceive the place they live in and their ties to that place (Chamlee-Wright and Storr 2009, Haney, 2018). Place attachment emerges as an insufficiently recognized concept in disaster situations (Adie, 2020). How place attachment is shaped by disasters is likely to have far-reaching consequences for individuals, families, and communities as they prepare for, experience, and recover from disaster events. In this context, a clear understanding of the role of place attachment is critical when considering how disaster victims attempt to recover their homes (Adams, 2016), communities (Oakes, 2019), and affected landscapes (Cope and Slack, 2017). After the earthquakes that occurred on February 6, 2023 and affected 13 provinces, many preschool children had to migrate to neighboring provinces with their surviving family members. The aim of this study is to examine the place attachment of children aged 4-6 in the post-disaster period from a holistic perspective using different data sources. It is believed that the research will make significant contributions to the literature both because it is based on up-to-date data and because it includes data specifically for children who have experienced forced displacement after a disaster.

Key Words – preschool education, child-centered disaster management, phenomenological research, spatial attachment, draw-and-tell technique.

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Comparative Study of Methylene Blue Adsorption from Aqueous Solution onto MCM-41 and Zeolite

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Abstract –.Water pollution caused by industrial dyes, such as methylene blue (MB), poses a significant threat to the environment and human health due to their toxicity and high resistance to biodegradation. This study focuses on an in-depth comparison of the adsorption performance of MB onto two adsorbent materials: MCM-41 and zeolite. The effects of various parameters, such as pH, adsorbent dose, and contact time, were systematically evaluated. Both materials follow pseudo-second-order kinetics, and their adsorption is described by the Langmuir isotherm, indicating a monolayer adsorption process. Thermodynamic analyses (ΔG°, ΔH° et ΔS°) reveal that the adsorption is spontaneous, endothermic, and physisorptive in nature. At an optimal pH of 6, MCM-41 exhibits a remarkable adsorption capacity of 71 mg/g, four times higher than that of zeolite (20 mg/g), highlighting its efficiency and potential for treating contaminated water.

Keywords – MCM-41, zeolite, methylene blue, adsorption, modeling, water treatment.

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Study of the Degradation of Cementitious Materials Containing Lead and Nickel in Neutral and Sulfate-Rich Environments

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Abstract – This study investigates the influence of the release kinetics of chemical species on the durability of stabilized/solidified (S/S) materials using a hydraulic binder, when exposed to chemically aggressive environments. To this end, formulations were made with a water/cement (W/C) ratio of 0.5. The formulation was doped with lead and nickel, metals specifically incorporated for this study. Several analytical techniques and experimental protocols were used, with the main approach being the monolithic leaching test (TLM). The effectiveness of the stabilization/solidification (S/S) treatment with CEM-I cement was evaluated, as well as the degradation of the materials under the influence of sulfates and demineralized water.

The results obtained from the TLM test over a period of 64 days demonstrate the effectiveness of the S/S process in reducing the potential of lead and nickel in the two environments studied.

Keywords – Stabilization/Solidification, Leaching, Release, TLM Test, Degradation.

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Bending analyses of dune sand based textile reinforced concrete

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Abstract – With the acceleration of climate change due to intense industrialization, there is an urgent need for eco-friendly resources to replace harmful materials. The construction industry, which consumes large amounts of cement and over-exploited natural materials like river sand, faces environmental issues such as erosion and damages to infrastructures. Overexploitation of river sand leads to environmental degradation and infrastructures damages. In an effort to combat this exploitation, recent research explores alternatives to river sand in concrete. Dunes, covering about 20% of the planet's surface, provide abundant sand with a low environmental impact due to its minimal energy and CO2 emissions. Researchers have found that dune sand can improve concrete's workability, reduce CO2 emissions, and enhance freeze-thaw resistance. Dune sand is particularly effective in high-performance mortar and precast concrete, making it an economical and ecological choice. Textile reinforced concrete (TRC) uses fibers for strength and flexibility, making it suitable for new structural designs and rehabilitation projects. The present work investigates the behavior of eco-friendly TRC , by replacing river sand by dune sand and increasing the sand/binder ratio to 2,53 in order to reduce cement use. The results show that the fine grain size of dune sand improves mortar compactness and penetration in yarns of the textile. This substitution has resulted in a gain of around 36 % in terms of flexural strength, resulting in an environmentally friendly building material, thus supporting the development of sustainable building materials.

Keywords – Textile Reinforced Concrete, Glass Fibers, Flexural behavior, sand

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NATURAL INGREDIENTS IN GREEN COSMETIC PRODUCTS FOR MANAGING DERMAL COMPLICATIONS IN DIABETES MELLITUS: A REVIEW

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Abstract: Diabetes mellitus is associated with a variety of skin complications, including dry skin, infections, delayed wound healing, and diabetic dermopathy. Managing these conditions often involves topical treatments, and natural remedies have gained popularity in recent years due to their accessibility and fewer side effects. Green cosmetics, which use natural and organic ingredients, offer an alternative approach to managing these skin issues. The use of natural, sustainable ingredients, have emerged as an alternative for treating dermal issues, particularly for individuals with diabetes. These products are often free from synthetic chemicals and preservatives, which may irritate sensitive skin. This review highlights the potential of various natural ingredients in green cosmetics, focusing on their effectiveness in alleviating dermal complications in diabetic patients. Emphasis is placed on ingredients such as aloe vera, chamomile, tea tree oil, calendula, and vitamin E, exploring their mechanisms of action, benefits, and possible clinical applications. The paper concludes by discussing the future of green cosmetics in dermatological care for diabetes and the need for further clinical studies.

Keywords: Diabetes mellitus, Green cosmetics, Natural and organic ingredients, Dermal complications

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Development and Characterization of Composites Based on Unsaturated Polyester Resin Reinforced with Recycled Polyethylene Terephthalate Fiber

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Abstract – In this study, we developed composite materials using synthesized unsaturated polyester resin and reinforcements derived from mechanically recycled polyethylene terephthalate (PET) bottles, which are a significant source of plastic waste. This project addressed the growing demand for sustainable solutions in the composite field in Algeria, offering new ecological, economic, and application perspectives. The work focused on the mechanical valorization of PET bottles into polyester fibers, which were incorporated as reinforcements in composites based on unsaturated polyester resin. This approach not only valorized plastic waste but also enhanced the mechanical properties of the composite materials. The study detailed the properties of the materials, their manufacturing process, and the characterization techniques used. It highlighted the various stages of composite development and the quality control methods employed. The results of experimental tests, including preliminary tests on the resin and fillers, as well as the outcomes for the corresponding composite materials, were presented. These data were accompanied by a thorough discussion of their significance and impact on the performance of the composites. In conclusion, this project offered an innovative solution for valorizing plastic waste and developing ecological composite materials. Future perspectives include optimizing composite formulations, assessing their durability, and applying them in various industrial sectors, thereby contributing to technological and environmental advancements in Algeria and beyond.

Keywords – Composites, Unsaturated polyester resin, Recycled polyethylene terephthalate, Waste valorization

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The Effect of IAA on the morphology of some medicinal plants

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Abstract – IAA is a synthetic auxin that affects the growth of roots, the lengthening of stems, and the general development of plants. IAA can promote adventitious root production in a controlled greenhouse setting, which will improve nutrient absorption and encourage more vigorous vegetative growth. As a result, plants may grow stronger, healthier, and have more established roots. Nevertheless, unfavorable outcomes include excessive stem growth, internode elongation, and structural instability might result from high IAA concentrations. In this paper, we have examined the effect of IAA on the morphology of some medicinal plants and we have observed that the application of IAA can be very benefic for the plants but at the same time the production of important bioactive substances in medicinal plants, such as alkaloids, flavonoids, or terpenes, may be adversely affected by an excess of IAA, which could upset the plant's overall hormonal balance. It is crucial to carefully dose the hormone to prevent side effects that could lower the quality of the bioactive principles utilized in phytotherapy, even if IAA treatment can enhance the growth and morphology of medicinal plants. So to use them we must know the optimum concentration that can benefit to the plants and avoid any excess when we use these phytohomones.

Keywords –Morphology- IAA – Auxine- Medicinal Plants - Effect

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Comparative Study of Methylene Blue (MB) and Bezacryl Yellow (BY) Adsorption on a Bioadsorbent Derived from Agricultural Waste

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Abstract – Wastewater management and dye treatment are major issues that ensure water quality and protect aquatic ecosystems. Research on methods to eliminate and degrade these substances is essential to reduce their impact and ensure a healthy aquatic environment.

In this study, we have used the powder of an agricultural waste to remove two cationic dyes, methylene blue (MB) and Bezacryl Yellow (BY). The adsorbent was characterized by various methods such as the BET method, scanning electron microscopy (SEM), and fluorescence spectroscopy (FX). The results showed that the adsorption capacities were 150.43 mg/g for MB and 112.36 mg/g for BY, respectively. The experimental results were used to determine the adsorption isotherms by applying the nonlinear models of Langmuir, Freundlich, and Temkin. Based on the values of the different parameters, we conclude that the most suitable model for the adsorption of both dyes is the Temkin model. Moreover, the adsorbent demonstrated good regeneration performance, using a hydrochloric acid solution (0.1M) for MB and a 90% ethanol solution for BY.

Thus, the powder of an agricultural waste can be considered an economical and environmentally friendly adsorbent for removing organic contaminants from wastewater.

Keywords – Dye, Treatment, Agricultural waste, Adsorption, Regeneration

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Study of steel bars buckling phenomenon

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Abstract – Instability is a risk of transition from a stable state to an unstable state of structures. In metal construction, three instability phenomena are distinguished: warping, deflection and buckling.
In this paper, we will study the phenomenon of buckling of steel bars in different aspects, first of all. a theoretical study according to Euler's theory which serves to determine the theoretical critical normal force that can support a compressed bar regardless of its enhancing conditions, in order to determine the parameters that include buckling (the length of the bar and enhancing conditions). Then, an experimental study using the WP120 device allows us to compare the results and understand the difference between the theoretical study which considers that the bar is perfect without defects, while the experimental study is closer to the real case taking into account the different existing defects (straightness defects, centering defects, etc.).
The third part is a regulatory study according to Eurocode 3 where safety coefficients are included in the calculations, allowing to take into account the different defects in the bar and thus reducing the normal critical force. Finally, a numerical study using the finite element method with the ETABS software, allowed to determine the numerical critical normal force and the maximum displacement which corresponds to it.

Keywords – Instability, buckling , metal construction, steel bars Euler's theory

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Regresyon Analizi ile Hava Kalitesinin Sağlık Üzerindeki Etkisinin İncelenmesi

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Özet **–**Küresel ısınma ve iklim değişikliğinin yoğun bir şekilde yaşandığı günümüzde hava kalitesi hem akut hem de kronik sağlık durumlarını etkileyen kritik bir rol üstlenmektedir. Bu makale, hava kirliliği ile sağlık etkileri arasındaki ilişkiyi analiz etmekte ve çeşitli regresyon analizleriyle en yüksek doğruluk oranını tespit etmektedir. Partikül madde (PM2.5 ve PM10), nitrojen dioksit (NO_2), kükürt dioksit (SO_2) ve ozon (O_3) gibi temel kirleticilerin hava kalitesi ölçümlerinin etkisini ortaya çıkarmaktadır. Aynı zamanda hava koşullarının da hava kalitesine etkisi göz önünde bulundurulmaktadır. Hem hava kalitesi ölçümleri hem de hava koşulları sağlık etkisi üzerinden değerlendirilmiştir. Makine öğrenmesi regresyonu, bağımsız değişkenler veya özellikler ile bağımlı bir değişken veya sonuç arasındaki ilişkiyi araştırmak için kullanılan bir tekniktir. Bu çalışmada aynı zamanda sağlık etkisi ölçümlemek için doğrusal regresyon, rasgele orman regresyon, k-en yakın komşu regresyon ve gradient boosting regresyonu kullanılmıştır. Sonuçlar incelendiğinde, rasgele orman Regresyon ve Gradient Boosting Regresyonun en iyi sonucu verdikleri, gradient boosting Regresyonun ise rasgele orman Regresyona göre daha hızlı sonuç ürettiği gözlenmiştir. Veriler incelendiğinde sağlık risklerini azaltmak için hava kirliliğini azaltmak ve küresel ve yerel aksiyonların alınması gerekliliği ortaya koymaktadır.

Anahtar Kelimeler –hava kalitesi, sağlık, regresyon, analiz, makine öğrenmesi

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Impact of COVID-19 on Consumer Sentiment in European Union

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Abstract – The COVID-19 pandemic has brought about a significant change in consumer behaviour and household financial decision making. The mood of society as a whole and of individual economic agents has changed according to the current pandemic situation and the countermeasures taken by the government. Economic sentiment and consumer confidence were generally considered to be reliable indicators of economic development. The present paper examines the impact of the COVID-19 pandemic on the evolution of sentiment using descriptive statistics. We have employed the Economic Sentiment Indicator and the Consumer Confidence Index as proxies for the sentiment and expectations of economic agents, and we have observed changes in sentiment at the aggregate level for both the Eurozone and the European Union as a whole. We focused on the 24-month period prior to the COVID-19 pandemic, which represents the period from 03/2018 to 02/2020. We then compared the calculated descriptive statistics with their equivalents obtained by recalculating from the 24 months immediately following the COVID-19 pandemic outbreak. Based on the results, we can confirm that the mood and expectations of the population changed precisely with the outbreak of the COVID-19 pandemic, which also brought a higher level of uncertainty. We have shown that before the COVID-19 pandemic, economic sentiment in both the Eurozone and the European Union was constant, with no major deviations. The turning point came just after the outbreak of the COVID-19 pandemic, when sentiment values showed a much wider range and the coefficient of variation also increased, with the standard deviation reaching values several times higher than it was before the pandemic. The COVID-19 pandemic has thus had a significant impact on the (consumer) sentiment of the population and has also led to an increased level of uncertainty, which has also had an impact on the financial behaviour of households. Households themselves generally became more financially conservative and in most cases also built up a financial buffer against exogenous shocks. This paper can therefore provide a basis for further research and understanding of changes in household financial decision making in the face of crises.

Keywords – households, sentiment, confidence, Economic Sentiment Indicator, Consumer Confidence Index

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Overview of E-Commerce and Digital Marketing: Evaluation of the Effects on Customer-Consumer

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Abstract – With the development of technology, people's access to the internet and computers has increased. Computer and internet usage is increasing day by day. Since its development, the Internet has been a channel through which people obtain information, interact and act accordingly. Firms need to analyze the wants and needs of consumers better now. Companies make sales by offering various products to consumers on the internet. Marketing transactions are carried out with the effect of interactive marketing regardless of where they are at any time to the customer and consumer groups they want to communicate with. Accordingly, digital marketing serves as an important channel for customer and company communication. The factors necessary for digital marketing, the benefits and harms for the customer and the company, the important points of marketing transactions in social media, communication with consumer groups in these channels, the effects on marketing processes and such factors are factors that should be considered and analyzed from the perspective of the company and the customer. Electronic marketing and e-commerce is a concept that emerged with the implementation of marketing practices in electronic environment. E-commerce in digital marketing, due to the increase in competition between companies, with the development of technology, companies have taken their marketing activities one step further and started to do them electronically. Researches and applications for these approaches have been examined in the literature and their effects on consumers and customers have been examined and evaluated.

Keywords – Consumer, Digital Marketing, E-commerce, Internet.

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CARDIOVASCULAR HEALTH AMONG MARKET WOMEN: A STUDY OF BLOOD PRESSURE AND RISK FACTORS IN OLORUNDA, NIGERIA

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Abstract - Studies reveal that market women are at significant risk of developing hypertension, with women generally more susceptible than men due to certain gender-specific factors. Hypertension is, however, preventable with proper awareness of its risk factors and a commitment to a healthy lifestyle. This study aimed to assess the prevalence and awareness of hypertension and its associated risk factors among market women in Olorunda LGA, Igbona, Osun State, between 2015 and 2016.

A descriptive cross-sectional approach was employed, utilizing a pretested questionnaire to collect data from respondents. Multistage sampling was used to determine the sample size. Data were analyzed, with key variables cross-tabulated, and findings were appropriately presented.

The study found a high awareness of hypertension among market women (74.6%), with stress, obesity, alcohol consumption, and smoking identified as the most perceived risk factors. The prevalence of hypertension was 39.8%, and a significant proportion of affected women were unaware of their condition. Predisposing factors included age, unhealthy lifestyle habits, obesity (65.4%), and lack of physical exercise (77.6%).

Despite high awareness levels, there was no corresponding reduction in hypertension prevalence among the women studied. The findings highlight the need for targeted public health interventions to enhance awareness and understanding of hypertension and its risk factors. Such initiatives should focus on promoting healthy lifestyles to effectively reduce the prevalence of hypertension in this vulnerable population.

Keywords; High Blood Pressure, Market Women, Risk Factors, Awareness

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Mathematical Modeling for Network Upgrades in Internet Service Provider Infrastructure

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Abstract – The ongoing growth of the need for superior Internet services creates great pressure on the ISPs as to the accurate estimation of network upgrade need. The following work introduces a mathematical modeling methodology that can assist in assessing network performance and identifying scenarios that require additional investment in network facilities. Bandwidth usage, server load, delay factors and throughput are evaluated for estimating the effect of different traffic conditions on the effectiveness of the network. This paper's simulations prove the model's usefulness in pinpointing such thresholds so that ISPs can prepare their upgrades and prevent performance constrictions on schedule. The results raise awareness of how higher resource efficiency and service provision can be attained through focused resource management and prevention or risk planning. This studies' contribution, thus, is in offering mathematical solutions to the ISPs that they can deploy to manage their operations, address the dynamic customer expectations, and deal with the complexities that continue to characterize the digital environment.

Keywords – mathematical modeling, network performance, network upgrades, bandwidth utilization, scalability analysis.

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Preparation and protein level of powder from beetroot and carob intended to athletes

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Abstract : The nutritional supplementation of athletes plays a pivotal role in enhancing performance and facilitating recovery. This study examines the protein composition found in beetroot and carob powder, elucidating their potential advantages for athletes. Both sources are identified as significant contributors of essential nutrients. In this study, we employed two types of plants: beetroot (Beta vulgaris) is commonly referred to as chuker, it is well-known for its natural sweetness, containing significant amounts of sugar while maintaining low calorie content and carob (Ceratonia siliqua),which has a pods and seeds with a rough texture that are widely used as raw materials in various industries such as in the food, pharmaceutical, and cosmetic sectors. The preparation of beetroot and carob powder involved several steps. Initially, raw materials were selected, with an emphasis on high-quality beetroots and carobs. then they were transformed into powder: beetroots were washed, peeled, dried, and ground into a fine powder, while carobs underwent a similar process, excluding peeling. Subsequently, the beetroot and carob powder were blended in predetermined ratios to achieve the desired composition. To examine the extraction yield and protein level, we used the aqueous decoction method, resulting in a yield of 10%. The protein concentration was determined using the Bradford protein assay, which revealed a protein level of 11.90 ± 0.143 g per 100 g of dry weight. In conclusion, the aqueous extract demonstrated a high protein content, making it an excellent choice for athletes.

Key words: Beet root, Carob, Protein level, Aqueous extract, Athletes.

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Chemical composition and antioxidant activity of *Globularia alypum* L. from the Oued Souf region

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Absract - *Globularia alypum* L., a member of the Globulariaceae family, holds significance in Algerian traditional medicine due to its abundance in secondary metabolites like polyphenols (flavonoids and phenolic acids), terpenoids, iridoids, and essential oils. Harvested in the Oued Souf region, the plant undergoes decoction and maceration successively to yield aqueous and methanolic extracts, with respective yields of 10.35% (w/w) and 33.98% (w/w).

Quantification of total phenolic compounds using the Folin-Ciocalteu reagent reveals 94.54 ± 0.59 mg GAE/mg extract in the aqueous extract and 95 ± 6.59 mg GAE/mg extract in the methanol extract. Total flavonoids, assessed via the $AlCl_3$ method, are measured at 18.27 ± 1.02 mg QE/g extract in the aqueous extract and 31.35 ± 1.32 mg QE/mg extract in the methanol extract.

Antioxidant activity, gauged through DPPH radical scavenging, shows an IC_{50} of 25.34 ± 1.76 µg/ml for the aqueous extract and 11.10 ± 3.95 µg/ml for the methanol extract, indicating superior performance by the methanol extract. These findings underscore the potential of *Globularia alypum* L. as a source of antioxidants, highlighting its relevance in both traditional medicine and contemporary scientific inquiry.

Keywords: Antioxidant activity, Globularia alypum L., Globulariaceae, Secondary metabolites, Taselga.

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Finite Element Critical Buckling Analysis of Carbon/Epoxy Laminated Composite Plates Under Uniaxial and Biaxial Loading Conditions

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Abstract – Laminated composites are extensively employed in marine, automotive, aerospace, military, and various other engineering applications due to their inherent tailorability, which allows customization to meet specific design requirements. The accurate determination of the buckling load capacity of composite plates under in-plane compressive loads is a critical aspect of designing robust composite structures. This study focuses on evaluating the critical buckling load factor of carbon/epoxy laminated composite plates with 16 and 64 layers, subjected to uniaxial and biaxial loading conditions. The composite plates under consideration are simply supported along all four edges.

The investigation emphasizes the influence of load ratios (Nx/Ny) on the critical buckling load factor. Finite element analyses were conducted using ANSYS 17.2, while analytical computations were performed with Mathematica based on classical lamination plate theory. Comparative assessments of analytical and numerical results were made, including a validation against existing literature. The findings reveal that the critical buckling load values obtained via analytical methods and finite element simulations exhibit high agreement, with discrepancies limited to approximately 3% under identical orientation angles.

For the loading condition LC2 (uniaxial loading, Ny = 1), the critical buckling load factor increases significantly with higher mode numbers. Conversely, the highest critical buckling load factor was observed under LC1 (uniaxial loading, Nx = 1), whereas the lowest was associated with LC5 (biaxial loading, Nx = 1, Ny = 2) for the first buckling mode.

Keywords – Laminated composite, buckling load, finite element analysis, buckling mode, carbon/epoxy

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An Application of Conformable Laplace Decomposition Method to Fractional Kaup-Kupershmidt Equation

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Abstract **–** In the field of nonlinear wave dynamics, this comprehensive study explores advanced computational methodologies for solving complex evolution equations. Utilizing the conformable Laplace decomposition method, we present a sophisticated mathematical framework for examining complex wave transformation mechanisms. By integrating fractional calculus principles with innovative decomposition techniques, our research reveals profound insights into the behavior of nonlinear evolutionary systems. The study demonstrates how computational strategies can effectively decode wave propagation characteristics, offering researchers a powerful tool for understanding complex dynamic processes across various scientific domains.

Keywords – Kaup-Kupershmidt equation; Conformable derivative; Adomian Decomposition Method

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MERKEZİYETSİZ OTONOM YÖNETİM SİSTEMİ YA DA YENİ NESİL ALGORİTMİK OTORİTERLİK

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Özet – Merkezi olmayan otonom örgütler merkezi olmayan teknolojik sistemler vasıtasıyla bağımsızlık ve özyönetim açısından özerklik vaat etmektedir. Uygulamada bu kuruluşların vaat edildiği kadar özerk olmadıkları belirtilmektedir. Teknolojiyi elinde tutan bu sayede akıllı sözleşmeleri tasarlama ve kodlama hakkına sahip olan kişi veya kuruluşlara yüksek seviyeli kontrol gücü sağladığı iddia edilen kuruluşlar tasarlayıcılarının dünya görüşünü yansıtmakta olduğu ileri sürülmektedir. Merkezi olmayan otonom organizasyonların vaat ettiği yönetim anlayışının sorgulandığı araştırmalar çerçevesinde itibar izleme ve puanlama sistemleri gibi yaklaşımlar vasıtasıyla bu kuruluşların insanların gözetlenmesini güçlendiren anlayışa hizmet eden dijital kuruluşlar olma potansiyelini taşıdığı ifade edilmiştir. Araştırmacılar teknolojiler gibi bilgisayar kodlarının da tasarlayanın dünya görüşünü yansıtacağını bu bağlamda kodların kişilerin eylemlerini yönlendirme gücüne sahip olduğunu ifade etmişlerdir. Buna göre teknoloji tarafsız değildir. Dijital teknolojiler kullanılarak davranış kalıplarının aşılanabileceği üzerinde yapılan tartışmalara örnek olarak kişisel egoyu ve ben merkezci duyguları tetikleyen sosyal medya uygulamaları verilmiştir. Blok zincir teknolojisinin çeşitli organizasyon uygulamaları üzerinde performans artışlarına neden olduğu inkâr edilemezdir ancak tehlikeli potansiyellere de sahip olduğu göz ardı edilmemelidir. Araştırmacılar bu bağlamda bu teknolojinin yarattığı potansiyellerin yanlış yönde kullanımının merkeziyetsiz özerk kuruluşlar yerine yeni nesil bir sosyal kredi sistemi veya otoriterlik anlayışına neden olabileceğini ileri sürmektedirler. Tüm bunlara ek bir risk faktörü olarak izlenmesi zor olan teknolojilerinden kaynaklanan avantajlardan yararlanmak isteyecek suç örgütlenmelerine dikkat çekilmektedir.

Anahtar Kelimeler – Merkeziyetsiz Otonom Örgütler, Yönetim, Bitcoin, Blockchain, Algoritmik Yönetişim

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Sakarya'da Yetişen Aronya Yaprağının Farklı Çözücü Özütlerinin Antioksidan Aktivitelerinin Değerlendirilmesi

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Özet – Antioksidanlar, serbest radikalleri nötralize eden ve dolayısıyla oksidatif strese karşı hücresel savunmayı sağlayan moleküllerdir. Serbest radikaller, hücresel metabolizma sırasında normal olarak üretilen, yüksek aktiviteye sahip bileşiklerdir. Bu bileşiklerin aşırı birikimi, hücresel yapılar üzerinde oksidatif hasara yol açarak yaşlanma, kanser, kardiyovasküler hastalıklar, nörolojik hastalıklar ve diğer kronik patolojilerin gelişimine neden olurlar. Antioksidanlar, serbest radikalleri etkisiz hale getirerek hücresel ve moleküler düzeyde koruma sağlar. Doğal antioksidanların bitkiler, meyve ve sebzelerde yoğun olarak bulunduğu bilinmekte ve bunların kullanımı ve araştırılması her geçen gün önem arz etmekte ve yeni kaynaklar bulunması araştırılması gerekmektedir. Bu çalışmada Sakarya'da yetişen aronya (*Aronia melanocarpa (Michx.) Elliott*) bitkisinin yapraklarının su ve etanol ile özütlenerek antioksidan aktiviteleri DPPH, FRAP ve CUPRAC metotları ile toplam fenol ve flavonoid miktarları belirlenmiştir. Elde edilen sonuçlar değerlendirildiğinde, aronya yaprak etanol özütünün tüm metotlarda su özütüne oranla daha yüksek antioksidan aktiviteye sahip olduğu belirlenmiştir.

Anahtar Kelimeler – Aronya, Antioksidan, DPPH, CUBRAC, Toplam fenol

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Ağır Vasıta Rot Kolu Toz Lastiklerinin Sızdırmazlık ve Malzeme Özelliklerinin İyileştirilmesi

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Özet **-** Araç sürüş konforu ve güvenliğini sağlayan en kritik sistemlerden bir tanesi şüphesiz süspansiyon sistemidir. Bu sistemin bir parçası olan rot kolu baş kısmında kullanılan toz lastiği ise bu önemli parçanın toz, kir, su vb. dış etkenlerden korunmasını sağlayarak rot kolu başının uzun ömürlü olması ve sağlıklı bir şekilde işlevini yerine getirmesi adına büyük önem teşkil etmektedir. Fakat toz lastiği, imal edildiği materyalin doğası gereği zayıf bir yapıda olmaktadır ve rot kolunu meydana getiren diğer bileşenlere nispeten çok çabuk aşınıp yıpranmakta ve işlevsiz hale gelmektedir. Bu çalışmada, toz lastiğinin mekanik ve dış etkilere karşı daha dayanıklı ve uzun ömürlü olması, tam sızdırmazlık sağlaması ve bu sayede sürüş konforu ve güvenliğinin sürdürülmesi amaçlanmıştır. Bu amaç doğrultusunda üç farklı toz lastiği malzemesi bileşen ve mekanik özellik açısından karakterize edilmiştir.

Anahtar Kelimeler – Toz Lastiği, Rot Kolu, Ağır Vasıta , Sızdırmazlık ,

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Securing Communications in Robot Operating System

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Abstract – In recent years, the development of robotics technology has given birth to a new generation of robotics software ROS. At present, most autonomous research systems are built using the ROS framework, which is a distributed framework in which nodes publish information used by other nodes.
Cyber-attacks pose an increasing threat to future robots. The shift to automation has increased relevance and confidence in robots. Robot safety has always been a secondary or triple priority, making robots vulnerable to cyber-attacks.
Robot safety has not always been a secondary or triple priority, but it is true that in the past, the focus has often been on the functionality and efficiency of robots rather than their safety and security.
There are several reasons why robots may be vulnerable to cyber-attacks. First, many robots are connected to the internet or other networks, which means that they are potentially accessible to hackers who can exploit vulnerabilities in their software or hardware. Second, robots often use standard communication protocols and software that may have known vulnerabilities or weaknesses.
Additionally, there may be a lack of attention or resources devoted to robot safety and security. Some manufacturers may prioritize getting their products to market quickly or keeping costs low, which can lead to shortcuts being taken in terms of safety and security. Furthermore, the complex nature of robotics systems, which can involve multiple components and subsystems, can make it difficult to ensure that all aspects of the system are secure.
However, as robots become more integrated into society and used in increasingly critical applications, such as healthcare and transportation, safety and security are becoming more of a priority. Regulatory bodies are also beginning to establish standards and guidelines for robot safety and security to ensure that these systems are designed and implemented in a way that minimizes risks to humans and other systems.
Protecting the robot must become an integral part of the structure (built-in). ROS is not just a post plugin, it is a widely used and popular open-source framework, and robots using ROS are becoming more and more popular. However, ROS is vulnerable to network attacks. Before robots using ROS become mainstream, ROS needs to be protected.
This poses a serious threat because malicious processes can easily interrupt communication, read private messages, and even replace nodes. The purpose of this research is to propose an architecture that uses an encryption and authentication engine to protect ROS to solve the most common ROS security problems. The advantage of the secure ROS architecture we provide is that there is no need to change the ROS software library and tools. It applies to all ROS client libraries and does not need to rebuild the node, therefore preventing man in the middle and hijacking attacks. We also conducted real-world experiments to evaluate the effectiveness of ROS security methods.

Keywords – ROS, AES-128, POLY 1305, hijacking, node

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IA OIL AND GAS DZ

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Abstract: The Algerian oil and gas industry is a key sector of the national economy. The integration of Artificial Intelligence (AI) represents a major opportunity to optimize operations, improve safety, and minimize environmental impact. This paper explores the applications of AI in various fields, including resource management, environmental monitoring, operational safety, and stakeholder engagement. AI, through techniques such as deep learning, large language models (L LM), and computer vision, can automate tasks, analyze vast amounts of data, and predict equipment failures. Predictive analytics, leak detection, logistics optimization, and real-time data analysis are all concrete examples of AI's contribution. Despite challenges related to implementation costs, model interpret-ability and big data requirements, AI offers considerable potential to transform the oil and gas industry in Algeria, promoting more efficient, safe and sustainable exploitation of resources.

Keywords – Artificial Intelligence (AI), Oil and Gas Industry, Algeria, Machine Learning

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Performance Comparison of Grey Wolf Optimizer and Perturb & Observe MPPT Methods in Transformerless Grid-Connected PV Systems

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Abstract The increasing adoption of single-phase transformerles grid-connected photovoltaic (PV) systems is driven by their lightweight design, compact structure, and improved operational efficiency. To ensure optimal energy extraction and reliable functionality under changing environmental conditions, advanced control strategies are essential. This study presents a comparative analysis of the Grey Wolf Optimizer (GWO)- based Maximum Power Point Tracking (MPPT) technique and the conventional Perturb and Observe (P&O) method for such PV systems. The GWO-based MPPT approach dynamically adjusts the duty cycle of the boost converter to optimize the PV panel's output voltage, ensuring maximum power extraction despite fluctuations in solar irradiance and temperature .

The Grey Wolf Optimizer employs a nature- inspired algorithm to efficiently locate the maximum power point (MPP) with advantages such as faster convergence and reduced oscillations near the operating point. The performance of the GWO-based MPPT is analyzed through MATLAB/Simulink simulations under diverse operating conditions. Key performance indicators, including response time, tracking accuracy, and overall energy transfer efficiency, are evaluated and benchmarked against the traditional P&O algorithm.

Simulation results revea l that the GWO-based MPPT outperforms P&O in terms of stability, energy harvesting, and dynamic performance, particularly under rapidly changing environmental scenarios. This comparative study demonstrates the potential of advanced o ptimization algorithms in enhancing the performance of transformerless grid-connected PV systems, contributing to more efficient and reliable renewable energy solutions.

Keywords Photovoltaic , MPPT, Grey Wolf Optimizer (GWO), Perturb and Observe (P&O), Transformerless Inverter

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Comparison of Sliding Mode and Integral Backstepping Control Techniques for MPPT in Transformerless Grid-Connected Photovoltaic Systems

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Abstract The growing implementation of single-phase transformerless grid-connected photovoltaic (PV) systems is motivated by their compact design, reduced weight, and enhanced operational efficiency. To achieve maximum energy harvesting and maintain reliable performance under varying environmental conditions, robust control strategies are imperative. This research presents a comparative analysis between two advanced control techniques: the Sliding Mode Control (SMC) and the Integral Backstepping approach, applied to grid-connected PV systems. These techniques are evaluated for their ability to dynamically regulate the boost converter's duty cycle, ensuring maximum power point tracking (MPPT) and efficient power transfer.

The Sliding Mode Control is known for its robustness against system uncertainties and external disturbances, while the Integral Backstepping method offers precise tracking and stability by addressing nonlinearities in the system dynamics. MATLAB/Simulink simulations are conducted under diverse environmental scenarios to assess the performance of both techniques. Key metrics such as response time, steady-state accuracy, tracking efficiency, and robustness against rapid changes in solar irradiance and temperature are examined.

The results demonstrate that both strategies significantly improve system performance compared to conventional MPPT methods. However, the Integral Backstepping approach exhibits superior tracking precision and reduced oscillations, whereas Sliding Mode Control provides enhanced stability under high variability conditions. This comparative study highlights the importance of selecting advanced MPPT techniques tailored to the specific requirements of transformerless grid-connected PV systems, contributing to the development of more reliable and efficient renewable energy solutions.

Keywords *Photovoltaic Systems, Maximum Power Point Tracking (MPPT),Sliding Mode Control (SMC),Integral Backstepping, Transformerless Grid-Connected Systems*

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A Comprehensive Comparative Study of PSO and Cuckoo Search Algorithms for Maximum Power Point Tracking in Photovoltaic Systems

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Abstract The growing integration of photovoltaic (PV) systems into both grid-tied and islanded power systems has led to the development of various Maximum Power Point Tracking (MPPT) algorithms to enhance energy extraction. The primary objective of this study is to enable PV systems to efficiently contribute to power grids by optimizing the power harvested from solar panels. This research focuses on two advanced evolutionary algorithms for MPPT: Particle Swarm Optimization (PSO) and the more recent Cuckoo Search (CS) algorithm. These controllers, implemented with a DC/DC boost converter, are designed to extract the maximum available power from the PV array. The system modeling and simulation were carried out using MATLAB/SIMULINK, allowing for the evaluation of the proposed algorithms under different environmental conditions, such as varying irradiance, temperature, and partial shading.
The performance of the PSO and CS algorithms was compared to the traditional Perturb and Observe (P&O) method, a widely used MPPT approach, across these diverse operating scenarios. Notably, the algorithms presented here rely solely on the PV voltage and current, which simplifies their implementation and enhances their cost-effectiveness. Simulation results indicate that the proposed controllers perform well under both transient and steady-state conditions, offering superior efficiency and stability compared to conventional methods. This study demonstrates the potential of PSO and CS algorithms to optimize MPPT in PV systems, providing an economically viable and effective solution for maximizing energy harvesting in diverse operational environments.

Keywords Maximum Power Point Tracking (MPPT), Particle Swarm Optimization (PSO), Cuckoo Search Algorithm, Photovoltaic Systems ,DC/DC Boost Converter

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Comparative Performance Analysis of Patch Antenna Designs for Wideband Applications

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Abstract – This paper describes the effect of antenna design in wideband applications. It compares two designs of patch antennas to meet the needs of UWB communication systems. Both antennas aim to cover the 3.1–10.6 GHz frequency range. The first design focused on a printed monopole patch antenna with a partial ground plane; the results show a bandwidth from 3.6 GHz to 15 GHz with a maximum gain of 6.1 dBi. Conversely, the second antenna employs a ring-shaped monopole design with a slotted ground plane to achieve gains of 4.2 dBi at 4.5 GHz and 6.8 dBi at 9.5 GHz. Both designs provide omnidirectional radiation patterns, but the monopole antenna extends the frequency range, while the second antenna offers better efficiency at crucial UWB frequencies. These antennas serve comparable applications, such as high-speed data transmission, but use different methods to optimize their performance.

Keywords – Patch, High speed communication, printed monopole antenna, ring shaped.

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Sakarya'da Yetişen Mandalina Yaprağının Antioksidan Aktivitelerinin Belirlenmesi

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Özet – Antioksidanlar, sağlık açısından birçok olumlu etkisi bulunan ve gıda takviyeleri, kozmetik ürünler ve işlenmiş gıdalarda sıkça bulunan bileşenlerdir. Sağlığa olan faydaları çeşitlilik gösteren antioksidanlar, vücudu kararsız radikallere karşı savunarak hücresel tahribatı önlemeye veya yavaşlatmaya yardımcı olur. Bunlar, besinler aracılığıyla veya takviye gıdalar yoluyla alınabilirler. Ayrıca vücut içinde de üretilebilirler, bu da vücudu dış tehditlere karşı korumak için doğal bir savunma mekanizması sağlar. Oksidatif stres, vücudun serbest radikalleri etkili bir şekilde temizleyemediği durumda ortaya çıkar. Buda hücrelerde DNA'da tahribatına ve hatta da hücre ölümüne yol açabilir. Antioksidanlar, vücudun oksidatif stresi dengelemesine yardımcı olur. Dolayısıyla, antioksidan bakımından zengin bir diyetle beslenmek oldukça önemlidir. Özellikle bir çok meyve ve sebze antioksidan açısından zengindir ve bunları diyete dahil etmek önemlidir. Günümüzde bu anlamda oldukça geniş çalışmalar yapılmakta ve yeni doğal antioksidan kaynakların bulunması önemli olmaktadır. Bu çalışma kapsamında, Sakarya bölgesinde yetiştirilen mandalina bitkisinin yaprağı etanol ve su ile ekstrakte edilerek bu ekstraktların antioksidan aktiviteleri beş farklı yöntemle incelenmiştir. Bu yöntemler DPPH (2,2-diphenyl-1-picrylhydrazyl) serbest radikal giderim testi, bakır iyonlarını indirgeme aktivitesi (CUPRAC), demir indirgeme kapasitesi, toplam fenol madde miktarı ve toplam flavonoid madde miktarı tayin yöntemleridir. Elde edilen sonuçlar değerlendirildiğinde mandalina yapraklarının etanol ekstraktının tüm antioksidan test değerlerinde su ekstraktına göre yüksek olduğu belirlenmiştir.

Anahtar Kelimeler – Antioksidan, Mandalina Yaprağı, DPPH aktivite, Bakır iyonlarını indirgeme (CUPRAC), İndirgeme kapasitesi

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Model Predictive Control for Maximum Power Point Tracking in Single-Phase Photovoltaic Systems

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Abstract In recent years, the demand for efficient Maximum Power Point Tracking (MPPT) in photovoltaic (PV) systems has increased, driven by the need for optimized energy generation in variable environmental conditions. This study explores the application of Model Predictive Control (MPC) for MPPT in single-phase PV systems, aiming to enhance energy conversion efficiency and system stability. MPC, a robust and predictive control strategy, is capable of forecasting future power output based on system dynamics and environmental variables, thereby optimizing the duty cycle of the converter to track the maximum power point (MPP) with high accuracy.

The proposed MPC-based MPPT method is compared with traditional methods, such as Perturb and Observe (P&O), in terms of tracking speed, stability, and power extraction efficiency. A detailed simulation model of a single-phase PV system, including a DC-DC boost converter and the grid interface, is developed using MATLAB/Simulink to assess the performance of the proposed control strategy. Various operating conditions, including temperature fluctuations, irradiance changes, and grid disturbances, are considered to evaluate the robustness of the MPC-based approach.

Simulation results demonstrate that the MPC-based MPPT algorithm offers superior performance over conventional methods, with faster convergence, reduced oscillations around the maximum power point, and improved dynamic response under rapidly changing environmental conditions. This study highlights the potential of Model Predictive Control in optimizing MPPT for single-phase PV systems, offering a promising solution for enhancing the efficiency and reliability of renewable energy generation.

Keywords Model Predictive Control (MPC) ,Maximum Power Point Tracking (MPPT) ,Photovoltaic Systems ,Single-Phase Inverter ,Energy Conversion Efficiency

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FOTOĞRAFÇILIK VE YEMEK STİLİSTLİĞİNİN MARKA İMAJI VE PAZARLAMAYA ETKİSİ

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Özet **–** Yemek stilistliği, yemeklerin estetik ve çekici bir şekilde sunulmasını sağlarken, yemek fotoğrafçılığı bu stilize edilmiş yemeklerin profesyonelce fotoğraflanmasıdır. Bu süreçler, markaların pazarlama stratejilerinde önemli bir yer tutar, çünkü görseller tüketicilerin marka algısını ve satın alma kararlarını etkiler. Günümüzde dijitalleşmenin etkisiyle, görsellerin önemi çok daha fazla artmıştır. Sosyal medya platformları, özellikle Instagram ve TikTok gibi görsel odaklı uygulamalar, yemek fotoğrafçılığı ve stilistliğinin gücünü daha da pekiştirmiştir. Tüketiciler, yemekleri ve yemekle ilgili içerikleri anlık olarak paylaşmakta ve birbirleriyle etkileşime girmektedir. Bu, markalar için büyük bir fırsat yaratırken, aynı zamanda güçlü bir pazarlama aracına dönüşmüştür. Yemek fotoğraflarının ve videolarının çekici olması, bir markanın daha geniş kitlelere ulaşmasını sağlar. Popüler sosyal medya figürleri, yemek stilistliği ve fotoğrafçılığı ile desteklenen içerikleriyle markaların görünürlüğünü artırır ve tüketici davranışlarını şekillendirir. İnfluencerlar, takipçilerine yemekleri sadece lezzetleriyle değil, görsel olarak da sunarak, markaların prestijini ve güvenilirliğini artırmaktadır. Bu çalışmanın amacı, yemek stilistliği ve fotoğrafçılığının, bir markanın imajı ve pazarlama stratejileri üzerindeki etkilerini dijitalleşme ve influencer iş birlikleri ışığında incelemektir. Yemek fotoğrafçılığı ve stilistliği, dijital çağda markaların pazarlama stratejilerine entegre bir şekilde çalışarak, müşteri algısını güçlendirir, marka sadakati oluşturur ve satışları artırır. Yemek görselleri, yalnızca yemeklerin değil, aynı zamanda markanın bütünsel imajını da yansıtarak markanın pazarlama faaliyetlerinde önemli bir yer tutmaktadır.

Anahtar Kelimeler – Yemek fotoğrafçılığı ve Stilistliği - Marka İmajı - Pink Lady Yarışması – Pazarlama iletişimi

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Effect of Patch Antenna Designs in Biomedical Field

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Abstract – This research compares two types of patch antennas for biomedical applications: flexible parasitic element patch antennas and silicon-based hexagonal patch antennas. These antennas are designed to operate at 2.4 GHz. The flexible parasitic element patch antenna is created for body-centric wireless communication systems, focusing on flexibility and improved efficiency. This antenna's bandwidth and gain are increased by integrating parasitic components. It is ideal for wearable and implantable medical devices, delivering dependable wireless communication with excellent radiation efficiency and consistent performance across a wide range of tissue conditions. This design employs flexible and biocompatible materials to provide minimum interference with human tissues and long-term operational safety. On the other hand, the silicon-based hexagonal patch antenna is tuned for excellent radiation efficiency, achieving 82.98% and offering a gain of 4.91 dB when measured on manufactured bodily tissue. The hexagonal design promotes compactness and improves impedance matching, making it suitable for both on- and in-body biomedical applications. Both antennas offer efficient, small, and safe biomedical telemetry solutions, with one concentrating on flexibility and the other stability, which improves wireless healthcare technologies.

Keywords – Parasitic element, ISM, Biomedical applications, Wideband.

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EEG-enabled Drowsiness Detection for Human Safety

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Abstract – Drowsiness is the sense of someone being sleepy, exhausted, or unable to maintain eye contact. Lethargy, weakness, and a lack of mental flexibility can accompany drowsiness, sometimes known as undue sleepiness. Whereas most people are experiencing some level of drowsiness from time to time, chronic drowsiness or weariness, particularly when it occurs at an inconvenient moment, may hint to a sleep disorder or other medical issue.

Many roads accidents accure due to many reasons one of reason is due to which accidents accure is drossiness. Drowsiness of drivers can cause accidents due to which not only drivers but passenger life is also in danger.

This research about "Drowsiness detection system for human safety with buzzer and using EEG(Electroencephalography)explains a system that signal and apply brake accordingly" notifies him. The brain waves are collected and amplified by the EEG headgear. After that, the signals are sent to an Android app for real-time analysis. These signals are subsequently sent to the Node MCU Wi-Fi module. Furthermore, Node MCU detects the sleepiness signal. And will activate the driver's alarm system and if any hurdle come in front of car, it will apply brake accordingly. The result in practice demonstrate that tiredness may be recognized in real time to keep the driver alert and prevent accident.

Keywords – EEG(Electroencephalography), Node MCU, Arduino, 16x2 LCD, EEG headgear

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Spectral problem for the diffusion operator with non-separated boundary condition linearly dependent on the eigenparameter

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Abstract **–** Spectral theory of differential operators is an intensively developing section of modern mathematics, the subject of which is boundary value problems of mathematical physics. The main issues of this theory include the study of the spectrum, expansion of a given function in eigenfunctions of a differential operator, and solution of inverse problems of spectral analysis. Interest in the spectral theory of differential operators (Schrödinger, Dirac, etc.) has especially increased in recent decades due to the development of quantum mechanics.

It is well known that inverse problems of spectral analysis, i.e. problems of reconstructing operators from some of their spectral data, play a fundamental role in various sections of mathematics. Inverse problems of spectral analysis are usually called problems in which it is required to reconstruct operators from their known spectral data. Such spectral data can be one, two or more spectra, a spectral function, a spectrum and normalization numbers, a Weyl function, a spectrum and a sequence of signs, etc. Various aspects of such problems and methods for solving them have been studied by many authors; a large number of works have been published on this topic. Since 1970, specialists have actively begun to study direct and inverse spectral problems for differential operators with non-separated (including periodic, quasiperiodic and generalized periodic) boundary conditions.

Some versions of direct and inverse problems for the differential diffusion equation, which is a natural generalization of the Sturm-Liouville equation, have previously been fully investigated. In this paper, we consider the diffusion equation under some boundary conditions, one of which is separated and the other non-separated, containing a linear function of the spectral parameter. Spectral data are found that uniquely determine the coefficients of the diffusion equation and the parameters of the boundary conditions. The main properties of these spectral data are studied.

Keywords – Diffusion operator, non-separated boundary condition, eigenvalues, spectral data

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A COMPARATIVE ANALYSIS OF CONTRIBUTION OF PROFESSIONALLY QUALIFIED AND NON-QUALIFIED TEACHERS IN DEVELOPING ACADEMIC CLIMATES OF SCHOOLS

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Abstract – The academic climate of a school significantly impacts students' learning outcomes, motivation, and overall development. Teachers play a pivotal role in shaping this climate. This study, titled *"A Comparative Analysis of the Contribution of Professionally Qualified and Non-Qualified Teachers in Developing Academic Climates of Schools,"* investigates the differences in how professionally qualified and non-qualified teachers contribute to fostering an effective academic environment. The study aims to determine how teachers with formal professional education influence various aspects of the school environment compared to those without such qualifications. This quantitative, descriptive study employed a self-developed questionnaire based on the academic climate indicators proposed by Wang and Degol (2016). The instrument consisted of 10 Likert-scale items designed to assess key dimensions of academic climate. The questionnaire items were validated and found reliable for the purpose of this study. The sample comprised 200 teachers (100 professionally qualified and 100 non-qualified) and 200 students (100 related to each group of teachers), making a total of 400 participants. Data were collected from various public and private schools, ensuring diversity in the sample. The independent samples *t*-test was applied to analyze the differences between the two groups of teachers concerning their role in developing an academic climate. The results of the study revealed a statistically significant difference between the contributions of professionally qualified and non-qualified teachers. Professionally qualified teachers demonstrated superior performance across all dimensions of academic climate compared to their non-qualified counterparts. Specifically, they were more effective in fostering positive teacher-student relationships, maintaining classroom discipline, employing diverse and effective instructional strategies, and enhancing overall student engagement and motivation. It was concluded that professionally qualified teachers play a significantly more effective role in developing the academic climate of schools compared to non-qualified teachers. This finding highlights the critical need for pre-service professional education and training as a prerequisite for teacher induction. Policymakers and educational administrators should consider making professional qualifications mandatory for teacher recruitment to ensure a high-quality learning environment in schools.

Key words: academic climate, professional qualification, classroom management, behavior

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Predicting Chronic Kidney Disease Using KNN, MLP and SVM

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Abstract – Chronic kidney disease can be stated by the gradual loss of kidney function over time. This condition inhibits the kidneys' ability to filter waste and excess fluids from the blood, which can eventually cause to kidney failure. In early phases, no symptoms can be seen; however, in advanced phases, the symptoms can lead to muscle cramps, high blood pressure, nausea, swelling and fatigue. This study is about the prediction of chronic kidney disease with the machine learning techniques as K-Nearest Neighbor, Multi-Layer Perceptron and Support Vector Machines. The chronic kidney disease dataset which was obtained from the UCI repository has been used to obtain the experimental results. The dataset consists of four hundred samples, eleven numeric and fourteen features. It also includes some missing values. In the preprocessing of the study, the missing values of the dataset has been replaced with mean values of the numeric features and the most frequent values of nominal features. After preprocessing operation, 10-fold cross validation has been applied to the dataset for training and testing the machine learning methods. The models have been trained by the methods of K-Nearest Neighbor with K=1, 2, 3 and 5, Multi-Layer Perceptron and Support Vector Machines with rbfkernel. The models have been tested by the most preferred metrics as precission, recall, accuracy and f-measure. For K-NN with K=1 and 2, MLP and SVM with rbfkernel, the best classification scores have been obtained as 96.5%, 97.8% and 96.8 recpectively.

Keywords – Chronic Kidney Disease, Machine Learning, K-Nearest Neighbor, Multi Layer Perceptron, Support Vector Machines

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The Influence of Nickel on the Corrosion Resistance of Zn-Ni Alloys

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Abstract – In the present study, direct electrochemical methods were employed to produce Zn-Ni alloys from zinc and nickel sulfate baths. To achieve optimal corrosion resistance, various nickel-to-zinc ratios were tested. Kinetic behavior and reduction potentials were analyzed using cyclic voltammetry (CV), while chronoamperometry (CA) was used to investigate the nucleation and growth processes of the alloys. The corrosion behavior of the Zn-Ni alloys, deposited on E24 stainless steel, was assessed in a 3.5 wt% NaCl solution through anodic polarization and electrochemical impedance spectroscopy (EIS). Finally, a structural analysis of the Zn-Ni alloys was conducted.

Keywords – Corrosion resistance, Anticorrosive Strategies, Synergistic Approaches Corrosion Alloys Zn-Ni.

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Biodegradable Packaging Film Production Using Purple Flour and Tapioca Starch

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Abstract – In recent years, the excessive use of plastic packaging materials has increased environmental concerns. Petroleum-based packaging causes serious environmental problems both. To overcome these environmental problems, environmentally friendly and biodegradable packaging materials have been developed. Many natural polymeric materials can be used to produce biodegradable packaging materials. Among these polymers, flour and starch are the most preferred materials due to their low cost and abundance. In this study, purple flour and tapioca starch were used at percentages of 2% and 3% of the film solutions. The moisture content, moisture uptake, swelling index, surface pH and pH values of all the produced films were determined. The moisture uptake capacities of films with low moisture contents were high as expected. The highest moisture uptake was found as 55.5% for the film produced with purple flour that used at 2%. Surface pH and pH values determined after dissolution of the films were found to be close to neutral values. Swelling capacity values, which are a parameter indicating the stability of the films, were found to be very high in all films produced with flour and starch. The results showed that the films produced in experimental studies can be used as packaging materials by adding some features to the films.

Keywords – Biodegradable film, packaging, purple flour, tapioca starch

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Cepstrum Analysis of Pressure Signals for Effective Leak Detection in WDNs

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Abstract – Detecting leaks in pipeline networks, particularly in water distribution systems, is a critical yet challenging endeavor. Despite the availability of various detection techniques, many are unsuitable for industrial applications due to limitations such as inefficiency and high costs. This study explores the use of cepstrum analysis, a robust signal processing technique, to detect and locate pipeline leaks by analyzing pressure signal measurements. The method begins with preprocessing pressure signals to eliminate noise using orthogonal wavelets, ensuring the accuracy of subsequent analysis. Cepstrum analysis is then applied to extract key features indicative of leaks. Previous research has shown that this approach can effectively identify leak locations and assess their severity in pipeline systems. Controlled experiments were conducted on a fluid-filled pipeline network, where pressure transducers recorded transient pressure drops caused by simulated leaks. The leaks were initiated using a push-button mechanism that operated a solenoid valve, with pressure signals captured at various pipeline distances from the leakage point. The results demonstrated that the cepstrum-based technique reliably detects and locates leaks with high precision, regardless of the distance from the leak.

This study underscores the potential of cepstrum analysis as a valuable tool for improving leak detection methodologies. By providing a cost-effective and efficient solution, this technique can enhance the integrity and operational efficiency of pipeline systems, addressing a critical need in water distribution networks (WDNs).

Keywords – Leak Detection, WDNs, Pressure Transducer, Cepstrum Analysis.

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The Role of IoT and Pressure Sensors for Leak Detection in WDNs

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Abstract **–** The convergence of the Internet of Things (IoT) with pressure sensor technology has revolutionized data acquisition and management, enabling unprecedented accuracy and efficiency in various applications. IoT facilitates real-time connectivity among sensors, allowing them to transmit vast amounts of pressure data to centralized systems for analysis and decision-making. This seamless integration has been fueled by the rapid growth in internet users, advancements in data rates, and enhanced service delivery capabilities. IoT not only enables the collection of large datasets but also opens avenues for their application across diverse industries. This paper highlights the relationship between IoT and pressure sensors, examining their transformative impact on sectors such as autonomous vehicles, industrial automation, smart homes, healthcare, smart cities, and agriculture. By leveraging advanced technologies like Machine Learning (ML), IoT enhances system optimization and operational efficiency. A focal point of this study is the application of IoT and pressure sensors in leak detection with in Water Distribution Networks (WDNs). Integrating ML algorithms with IoT-connected pressure sensors allows for the identification and localization of leaks, ensuring effective system monitoring and maintenance. This approach significantly reduces water loss, operational costs, and downtime, contributing to the sustainability and reliability of WDNs.

Through the fusion of IoT and pressure sensors, this paper underscores the potential to optimize processes, improve service delivery, and foster innovation across multiple domains.

Keywords – Internet of Things (IoT), Machine Learning (ML), Pressure Sensors, WDNs.

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Innovative Applications of MOF-2 in Polymer Nanocomposites: Synthesis, Characterization, and Functional Enhancements for Environmental Sustainability

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Abstract – Metal-organic frameworks (MOFs), particularly MOF-2, have garnered significant attention due to their versatile structure and exceptional properties. This work investigates innovative applications of MOF-2 in polymer nanocomposites, focusing on its integration into PLA/PBAT matrices. An optimized synthesis of MOF-2 was performed, followed by comprehensive characterization using techniques such as electron microscopy, thermogravimetric analysis (TGA), and dynamic mechanical analysis (DMA). The results reveal that incorporating MOF-2 significantly enhances the mechanical, thermal, and barrier properties of the polymers. These advancements pave the way for promising environmental applications, particularly in biodegradable packaging and efficient effluent treatment. This study highlights the potential of MOF-2 as a key functional additive for sustainable and innovative solutions.

Keywords – Metal-organic frameworks (MOFs), Polymer nanocomposites, Barrier properties, Advanced characterization, Biodegradable packaging.

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Kuantum Dayanıklı Kriptografik Algoritmaların Performans Analizi

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Özet **–** Amerikalı matematikçi Peter Shor 1994'te geliştirmiş olduğu algoritma ile şifrekıran kuantum bilgisayarların da yardımıyla ayrık logaritma ve çarpanlara ayırma problemlerinin polinom zamanda çözülebileceğini göstermiştir. Bugün İnternet, güvenliği bu iki problemin zorluğuna dayanan Diffie-Hellman anahtar kurulum algoritmasına ve RSA kriptosistemine dayanmaktadır. Her ne kadar şifrekıran kuantum bilgisayarlar henüz geliştirilememiş olsa da kötü niyetli İnternet kullanıcıları *şimdi depola, sonra deşifrele* yaklaşımını kullanarak İnternet trafiğini depolayıp bu bilgisayarlar geliştirildiğinde onlardan faydalanarak şifrelenmiş mesajların içeriğine erişebileceklerdir. NIST bunu önlemek amacıyla 2016 yılında bir standartlaştırma süreci başlatmıştır. Tüm ilgilileri şifrekıran kuantum bilgisayarlara dayanıklı açık anahtarlı şifreleme ve anahtar kurulum algoritmaları ile dijital imza algoritmaları geliştirip bu sürece katkıda bulunmaya davet etmiştir. NIST üç değerlendirme turunun ardından 2022'de standartlaştırmaya karar verdiği dört algoritmayı açıkladı: Kyber, Dilithium, SPHINCS+ ve Falcon. 2024'te bu algoritmaların ilk üçü sırasıyla ML-KEM, ML-DSA ve SLH-DSA isimleriyle ve yine sırasıyla FIPS 203, FIPS 204 ve FIPS 205 kodlarıyla standartlaştırılmıştır. Falcon'un standartlaştırılması ileri bir tarihe ertelenmekle birlikte açık anahtarlı şifreleme ve anahtar kurulumunda kullanılmak üzere sunulan bazı algoritmaların dördüncü tur değerlendirmeleri halihazırda devam etmektedir. Biz bu çalışmada standartlaştırılmış bu üç algoritmanın çalışma prensiplerini açıkladık ve farklı güvenlik seviyesi sağlayan değişkelerin performanslarını ürettiği anahtarların, şifreli metinlerin, dijital imzaların uzunluğuna ve kapsülleme/dekapsülleme, dijital imza üretme/doğrulama sürelerine göre test ettik. Test sonuçları bize ML-KEM algoritmasının şimdiden anahtar kurulumunda kullanılabileceğini, kullanım gerekliliklerine göre ML-DSA ve SLH-DSA algoritmalarından birinin tercih edilebileceğini göstermiştir.

Anahtar Kelimeler – kuantum hesaplama, kuantum dayanıklı kriptografi, açık anahtarlı kriptografi, anahtar kapsülleme mekanizması

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Finger Vein-Based Human Identification Using Deep Learning Techniques and Gray Wolf Optimization

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Abstract – Finger vein (FV) recognition is a highly secure biometric method that leverages the unique vein patterns beneath the skin for individual authentication. In this study, we propose an innovative approach that combines deep learning techniques for feature extraction with Gray Wolf Optimization (GWO) to enhance recognition performance. The deep learning framework effectively captures intricate vein patterns, while GWO optimizes feature selection and model parameters for improved accuracy. Extensive experiments on publicly available datasets validate the efficacy of the proposed method, demonstrating its potential to advance FV-based biometric systems.

Keywords – Finger vein identification, Biometric, Deep learning, Gray Wolf Optimization (GWO), Feature extraction.

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Accumulation of heavy metals in soil and terrestrial plants of urban and suburban areas depending on anthropogenic load

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Abstract – Heavy metals are hazardous pollutants associated with anthropogenic activities. Land plants are capable of accumulating metals and serving as bioindicators of environmental pollution. The aim of this study was to assess the accumulation of Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn in soil and herbaceous plants of urban and suburban areas with different levels of anthropogenic load. Soil and plant materials (*Achillea millefolium*, *Equisetum arvense*, *Plantago major*, *Taraxacum officinale* and *Urtica dioica*) were sampled at nine locations within the city of Lviv (Ukraine) and in areas adjacent to the city, as well as at three sites in forest park areas. Metal concentrations in the samples was determined using atomic absorption spectrophotometry.

The study found significantly higher concentrations of heavy metals in soil and plants collected from areas with industrial and transport loads compared to those in samples from forest park areas. The most pronounced differences between samples from urban areas and those from the green zone were found in Mn, Pb and Zn concentrations. Heavy metal concentrations in *Taraxacum officinale* plants were most clearly correlated with their content in the soil. *Equisetum arvense* plants accumulated heavy metals more intensively than other analyzed plant species. Overall, the obtained results indicate a connection between the level of anthropogenic load in urban and suburban areas and the accumulation of heavy metals in the analyzed plant species, as well as the bioindicator potential of *Taraxacum officinale* plants in relation to soil pollution with heavy metals.

Keywords – heavy metals, soil pollution, terrestrial plants, bioindication, urban areas

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A Hybrid Transformer-CNN Architecture for Robust Palm Print Recognition

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Abstract **–** Palm print recognition has gained significant attention in recent years due to its unique advantages, including high security, user convenience, and reliable individual authentication. Although vision transformers have shown promising results in palm print recognition by capturing global spatial relationships, their computational demands and performance limitations compared to convolutional neural networks (CNNs) present challenges. To address these challenges, we propose a hybrid network that integrates the strengths of both transformers and CNNs. This architecture leverages transformers for modeling long-range dependencies and CNNs for extracting fine-grained local features, offering a robust solution for palm print identification. Extensive experiments on publicly available palm print datasets demonstrate the effectiveness of the proposed approach, highlighting its potential to enhance the accuracy and efficiency of palm print recognition systems.

Keywords – Palm print recognition, Biometric, Vision transformers , Convolutional neural networks (CNNs), Hybrid network.

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An innovative approach to safeguarding vegetable farming.

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Abstract **-** Worldwide, the problem of pest insects affects vegetable crops, and the use of chemical products can lead to undesirable side effects. To mitigate these risks and combat pest insects, we carried out an isolation from beeswax and potato seedling soil. This study explores the diversity of microorganisms and their application, focusing on bacteria and fungi. A rigorous isolation process was conducted under controlled conditions, including replanting, purification, and preservation. Microorganism identification was carried out through both macroscopic and microscopic observations. The results identified several microorganisms: *Bacillus*, *Aspergillus niger*, *Rhizopus*, *Alternaria*, *Fusarium*, *Mucor*, *Penicillium*, and yeasts, each with potential significance for species identification. These isolated microorganisms could contribute to pest control by providing an insecticidal effect for the development of a biopesticide protecting vegetable crops, including potatoes and tomatoes.

Keywords– isolation, fungus, bacteria, identification, insecticide.

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Development of a Transdermal Film Based on Diclofenac Sodium

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Abstract: Bioadhesive polymers play a pivotal role in the development of drug delivery systems and medical devices. Bioadhesion refers to the ability of certain materials, particularly polymers, to adhere to biological surfaces such as skin, mucous membranes, or specific tissues. This property is utilized to enhance therapeutic efficacy by extending the contact time of the drug or device with the target surface.

This study aimed to design a medicated film containing the anti-inflammatory agent diclofenac, formulated with bioadhesive polymers such as NaCMC, HEC, and PVP K30 for transdermal delivery. The films were developed using the solvent casting technique, based on a matrix of trials (F1 to F5). They were characterized through physicochemical and biopharmaceutical evaluations, including assessments of physical appearance, thickness, mass and content uniformity, infrared spectroscopy, and in vitro dissolution testing to monitor drug release.

The results demonstrated that NaCMC significantly impacted the physicochemical and pharmacokinetic properties of the transdermal patch. In vitro dissolution studies at pH 6.8 highlighted its influence on the drug release profile. The F3 formulation exhibited sustained release, with 36% of the drug released at 15 minutes and a maximum of 85.5% at 300 minutes.

This advancement offers a promising therapeutic option for managing inflammatory conditions by improving drug bioavailability and reducing dosing frequency. While these findings are encouraging, further studies are necessary to refine the formulation and validate its efficacy under in vivo conditions.

Keywords – Bioadhesive polymers, transdermal film, diclofenac sodium, In vitro dissolution release.

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Valorization of Algerian Luffa for the elimination of methylene blue

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Abstract – Pollution of water and soil is currently a major problem which is constantly increasing with industrial development, particularly in chemical industries , food, textile and pharmaceutical industries.The present study is concerned with the removal of a cationic dye namely, methylene blue from aqueous solution by adsorption onto low cost adsorbent such as Luffa Cylindrica (LC).

Researchers reported that LC was found to be a good adsorbent, due to its high degree of porosity, high specific pore volume, stable physical properties, non-toxicity and low cost. Research has therefore focused, among other things, on the ability of different metals to attach to LC.

Before starting the study of adsorption of toxic pollutants and the effects of physicochemical parameters on adsorption performance, the physicochemical, structural and morphological characterization of this material (LC) was carried out by (IR) spectroscopy, (BET) surface area analyzer, and by the SEM technique , the latter showed that the surface is heterogeneous, irregular and porous ,and BET surface area of LC was 46.396 m^2/g.

Batch adsorption experiments were performed as a function of pH, contact time, methylene blue concentration, adsorbent dose and temperature. The optimum conditions for maximum adsorption were attained at pH= 6, LC dose of 2 g and particle size of LC d < 0.08mm ,T=25°C.

Keywords – Biosorption , Luffa Cylindrica , Copper (II), Characterization.

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Study of the influence of adding fine particles contained in the crushed sand on the properties of concrete

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Abstract – The very high demand for construction sand in Algeria and the scarcity of this material have led to behaviors that have caused serious and sometimes irreversible damage to the environment.
This is the case with the illicit extraction of wadi sand and beach sand where the latter were finally closed.
On the other hand, quarries exploit large deposits of rock, mainly limestone; reject after crushing an equally large quantity of crushed sand, the latter occupies an increasingly large storage area which poses the problem of its evacuation.
In order to limit these problems, we carried out a study aimed at using quarry sand, which is available in large quantities and which could replace sea sand and verify its influence on the shrinkage and strength of concrete.
As a result of this work, we clearly see that the optimal composition is 10% fines. If we go back to the shrinkage, we see that at this percentage the latter is maximum, so for general interest, we judged that the formulation with 15% fines is also interesting due to the fact that it presents an acceptable resistance (close to that of 10%) and a lesser withdrawal. All these observations led to the acceptance of a limit of 15% fines in limestone sand

Keywords – Quarry sand, Fines, Concretes, Mortars, Mechanical strength, Shrinkage.

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Yapay Zekâ Kullanılarak Sağlık Alanına Yönelik Yapılan Çalışmaların Bibliyometrik Analizden Elde Edilen Bulgular

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Özet – Son yıllarda yapay zekâ kullanımı bütün alanlara yayılmaya başlamıştır. Bu alanların başında da sağlık alanı gelmektedir. Bu bağlamda çalışmada uluslararası düzeyde sağlık alanında yapay zekâ kullanılan çalışmaların güncel eğilimleri araştırılmaktadır. Çalışmada Web of Science veri tabanında yapay zekâ ve sağlık alanlarında yapılan çalışmalar seçilerek bulunan yayınların bibliyometrik analizi beş performans göstergesi açısından incelenmiştir. Bunlar; Ortak Yazarlık Analizi, Yazarların Atıf Analizi, Ülkelerin Atıf Analizi, Kurumların Atıf Analizi ve Anahtar Sözcük Analizidir. Sonuçlar sağlık alanında yapay zekâ teknolojilerinin kullanılması arttıkça yapılan çalışma sayısının da bu oranda artması ve multidisipliner ilişkilerin güçlenmesi gerektiğini ortaya koymaktadır.

Anahtar Kelimeler – Yapay Zekâ, Sağlık, VOSviewer, Derin Öğrenme, Bibliyometrik

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Variational Models and Relevance Feedback to improve image Retrieval approach

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Abstract **-** Multimedia data has recently become an important part of our lives. Images are important in many areas and provide important information. Processing of this information is necessary to extract valuable information. Furthermore, the field of image mining seems to offer vital assistance to systems and people who need to extract knowledge from an image dataset. One type of image mining called Content Based Image Retrieval (CBIR) attempts to extract related images from huge image databases based on user preferences. However, the main problem with this method is how to retrieve relevant images. In this study, we focus on reducing the semantic gap between query images and retrieving similar images to improve the performance of content-based image retrieval systems. To ensure relevant retrieval, the proposed approach provides an effective solution based on the TV-L^1 model and relevance feedback. Finally, the evaluation is conducted to show the accuracy of the results using the precision and recall metrics.

Keywords: Content Based Image Retrieval, Multiscale Decomposition, Variational Models Decomposition, TV-L^1 Model, Relevant Images, Texture Feature, Colour Feature, Shape Feature

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Numerical Study of Incompressible Navier-Stokes Equations

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Abstract – We present a simulation of the Navier-Stokes equations using a finite volume approach. The fluid (or elastic) domain Ω is assumed to be incompressible and viscous. The discretization in space is done using an upwind schema. The convective term is linearized along the process. We get an implicite discret form which we will put in to test using simulation techniques (MatLab/SciLab) and compare the results with the literature.

Keywords – Finite Volume Methods, MatLab, Navier-Stokes Equations, Numerical Simulations, SciLab

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Numerical Simulation of Solutions for Δ-Problem in 2 and 3 dimensions

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Abstract **–** We present a numerical solution and simulation of the Laplacian equation for any bord conditions using a finite volume approach. We choose a rectangular domain Ω (square in $\mathbb{R}^2$ and Cube in $\mathbb{R}^3$). We use an operator to transform a 2 or 3 dimensions numbering into a 1 dimension numbering. We search for a test problem with known exact solution to text our results using simulation techniques (MatLab/SciLab) and compare the results with the literature.

Keywords – Laplacian Equation, Finit Volume Methods, Matlab, Numerical Simulation, Scilab

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Simulation of the flood wave caused by hypothetical failure of the Manbaa-Al-Ghozlan Dam

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Abstract – In this research, the flood wave resulting from the hypothetical overtopping failure of the Manbaa-Al-Ghozlan Dam on Biskra River, Algeria, was simulated, utilizing the ArcMap and HEC-RAS software and the observed field data. Flooding parameters were calculated, for the study reaching from the Manbaa-Al-Ghozlan Dam to Biskra city and surrounding cities. The Manning coefficient of the study reach was calibrated to 0.034 and 0.06 for the main river and the floodplain, respectively. The results showed the flood wave propagation along the study reach, the flood hydrograph, and time to the peak discharge/time to the maximum water surface elevation, maximum velocity, and width of the inundated area at the selected cities. The analysis outputs and the inundation maps can be used to provide an emergency action plan for the flooded regions. The results of the scenario confirmed the water depth varying between 16m and 40m in the city of El Outaya and can exceed 16 meters in the city of Biskra, and this performs as a great danger for the zone. This simulation allowed designing the dam failure hazards map, which showed the areas threatened by flood waves, and consequently required a plan of security measures to moderate as much as possible the consequences of a dam collapse.

Keywords – ArcMap -HEC-RAS - Manbaa-Al-Ghozlan Dam -dam break -flood

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Using fixed-point theory to study the stability of linear, neutral differential equations with variable delays

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Abstract – It has long been our view that Lyapunov's direct method is the leading technique for dealing with stability problems in many areas of differential equations. However, there is a large set of problems for which it has been ineffective. Recently, Burton, Furumochi, and others studied stability using fixed point theory. Moreover, the fixed point theory not only solves the stability problem, but it also has a number of other advantages over Lyapunov's direct technique. The former's circumstances are frequently average, whereas the latter's are frequently pointwise. In this work, by using the contraction mapping theorem, we study the asymptotic behavior and stability results of the zero solution of a linear, neutral differential equation with variable delays. An asymptotic stability theorem with a necessary and sufficient condition is proved.

Keywords –Fixed points theory, contraction mapping theorem, neutral differential equation, variable delays, stability

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Application of vegetable oils in the field of food packaging

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Abstract **–** Essential oils and extracts from aromatic and medicinal plants have been extensively researched not only for being natural products, but also because they have been shown to have biological properties, nutritional and health benefits for food and humans. They have been widely studied and exploited because of their biological properties. In general, the major bioactive components present in essential oils and extracts are mainly responsible for their biological activities, but minor compounds may also contribute and may show synergistic activity. A wide variety of essential oils and extracts from different aromatic plants have been applied in the manufacture of food packaging. These substances have been applied to low cost non-biodegradable polymers and biopolymers with complex processing. In this study we used poly lactic acid and polyhydroxyalkanoate as polymeric matrices and as active substances the essential oils of thyme and pistachio, which are traditionally known for their therapeutic effects and their antimicrobial, antibacterial and nutritional properties.

Keywords – Biopolymer, Essential oils, Packagin, Mechanical properties.

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A Comparative Study of Pre-heating and Recompression Brayton System for Solar Tower Plants

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Abstract – To achieve high performance from a solar power plant, it is vital to select the most appropriate type of thermodynamic system. Therefore, in this study, a comparative study of preheating and recompression Brayton systems was conducted to determine the best thermodynamic system that can achieve higher performance. The transmitted power to the working fluid is fixed at 30 MW. The Aspen Hysys software was used to generate the preliminary design. The turbine exhausts were used in the preheating system to heat the outlet compressor air via a heat exchanger situated before the central receiver, where the concentrated solar power is reflected. According to the findings, the pre-heating and recompression systems have, respectively, a thermal efficiency and power output of 53% (21.83 MW) and 49.21% (23.24 MW). Consequentially, in terms of thermal efficiency, the pre-heating system outperforms the recompression system. However, the latter achieves the highest power output.

Keywords – Brayton, Performance, Pre-heating, Recompression, Solar Tower.

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Properties of Waste Brick Powder based Geopolymer Mortar

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Abstract – Geopolymer mortar refers to the mortar made with sand and geopolymer, which is composed of the base materials containing aluminum and silicon tributaries that have been activated by adopting an alkaline solution to serve as a binder. The study of the properties and application of geopolymer mortar has attracted increasing attention from researchers and cement-based industries due to its durability advantages. This study examines the properties of geopolymer mortars, including physical properties, mechanical properties (compressive strength, tensile strength, flexural performance. This paper represents the effect of curing temperature duration on the strength of geopolymer mortar based on waste brick powder (WBP). The geopolymer mortar was produced from WBP, activated with sodium silicates and sodium hydroxide solution. The ratio of WBP to solution was 1.45 and the ratio of sodium silicates to sodium hydroxide was 2.5. The prismatic specimen was cured at a temperature of 55 °C with a curing period of 1, 2, 3, 4, 5, 6 and 7 days. The ultimate compressive strength (i.e. 24.65 KN/m^2) was obtained in mixtures of 10 mol NaOH with a curing period of 6 days.

Keywords – Geopolymer mortar, temperature, waste brick powder, alkaline solution

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Adsorption of acid dye on intercalated clay nanoparticles

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Abstract – In this work, we studied the adsorption of an acid dye, Congo red, in aqueous solution on raw and intercalated clay in batch mode. Adsorption tests have shown that equilibrium is established after 120 minutes. The experimental results showed that the adsorption of Congo red dye on raw and intercalated clay depends on the pH of the solution. The adsorption kinetics of Congo red was studied using the pseudo-first order, pseudo-second order, intra-particle diffusion and Elovitch equations. The effect of temperature on dye adsorption was also studied. L'adsorption du colorant rouge congo sur l'argile brute et intercalée peut être décrite par les cinétiques de pseudo-second ordre et d'Elovitch.

Keywords – adsorption, intercalated clay, acid dye, kinetic study

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Physico-mechanical properties of concretes composed of hybrid binder (cement/geopolymer)

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Abstract – The main objective of this paper is to study the feasibility of using finely ground calcined clay waste (FGCCW) and ground dune sand (GDS) as geopolymer binder in the production of concrete, and also to study their impacts on the physical and mechanical properties of concrete made from this binder. Three levels of (FGCCW) and three concentrations of NaOH were examined, 10%, 20% and 30% and 4M, 8M and 12M respectively. A curing regime at a temperature of 42°C with three cycles followed by curing in water was examined on the geopolymer concrete specimens. Slump test, density, and compressive strength at 7 and 28 days were evaluated on fresh and hardened concrete. The results show that a rate of 10% of (GDS) and 20% of (FGCCW) and 8M concentration of NaOH can be used for production of geopolymer binder and a concrete with plastic workability. Substituting cement with 20% of (FGCCW) showed the best compressive strength when using 8 M of NaOH. Curing in water after temperature curing at 42°C improves the compressive strength of concretes that contain 10% of (GDS) and 20% of (FGCCW) and 8M of NaOH.

Keywords – Geopolymer; calcined clay; dune sand; curing regime, molarity

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Analysis of flow problem without gravity effect

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Abstract – In this work, it is proposed to study a Two-dimensional free-surface flows of inviscid and incompressible fluid of a liquid poured from a container is calculated analytically for various configuration of the lip. The flows is irrotational and The effects of surface tension is neglected. It is shown that ther are jet like flows and other flows with one free surface which fllow along the underside of the lip or spout. Some of the results are applicable also to flows over weirs and spillways. we adopted a resolution method based on the free streamlines theory and Shwartz-christoffel transformation technique to solve the problem for various values β of the inclination angle between the horizontal bottom and the inclined wall.

Keywords – Free surface, flow, hodograph method, free streamlines theory, Shwartz-Christoffel Transformation.

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EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF THE EXTRACT of ficus carica leaves in Setif Algeria

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Abstract – The fig tree is a sacred tree very old known in different civilizations and religions, and whose history begins since antiquity, it is recognized as a sacred fruit and is featured in all the holy books. It is cited in “Sourat Attine” of the Koran.

It is proven that figs extracts can act as natural antibacterial agents. This activity is due to phenolic compounds especially flavonoids. It was demonstrated by the antibiogram method, that Ficus carica leaves have antimicrobial activity.

In this context, the objective of this work is to study the comparative antibacterial activity of aqueous and ethanolic extracts of Ficus carica in setif algerie.

Keywords – Ficus carica; antibacterial; inhibition zone; Escherichia Coli, Staphylococcus aureus; Pseudomonas aeruginosa .

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Multicomponent synthesis, biological evaluation and computer-aided molecular design of novel α-aminophosphonate

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Abstract - Microwave-assisted organic synthesis, a green chemistry approach, is nowadays widely used in bioactive molecules synthesis. Microwave-assisted synthesis improves both throughput and turnaround time for medicinal chemists by offering the benefits of drastically reduced reaction times, increased yields, and pure products. Amino phosphonates are an important class of organic compounds due to their structural similarity with natural α-amino acids, flexibility, and structural diversities due to the presence of phosphonate groups. In the present work, some Aminophosphonates were synthesized using the microwave heating method, by condensation of the aromatic aldehydes and diethyl phosphite with different aromatic primary amines. They were characterized by means of spectral data and subsequently subjected to the *in vitro* antibacterial activities against gram-positive and gram-negative strains of microbes. It was observed that the compound with electron-withdrawing substituents exhibited good antibacterial activities against almost all the microorganisms. Moreover, the effect of the substituents on the compounds and their reactivity has also been studied by Density Functional Theory (DFT) using the hybrid B3LYP/6–31 G method.

Keywords Microwave, Aminophosphonates, DFT, Antibacterial activity , green chemistry

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Synthesis of functionalized amide from isolated cholic acid and Characterization

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Abstract – Amides are common functional groups that have been studied for more than a century. They are the key building blocks of proteins and are also present in a wide range of other natural and synthetic compounds. Amides are known to be poor electrophiles, which is typically attributed to the resonance stability of the amide bond. The synthesis of biologically active compounds will be the major goal of this research Amides will be synthesized by the reaction of an ester with an amine. The amide functional group is ubiquitous and one of the most important motifs in pharmaceuticals, agrochemicals, and other valuable products. The compounds will be synthesized in the department of Applied Chemistry. Targeted compounds will be characterized through melting point, FTIR, X-ray Diffraction and other available spectroscopic techniques such as ^{1}H-NMR and ^{13}C-NMR. The separation of compounds and other impurities will be done through column chromatography and preparative chromatography. The synthesized amides will be further screened for their biological activities like anti-cancer, anti-bacterial and anti-fungal.

Keywords – Natural acid, Primary bile acid, Chenodeoxycholic Acid.

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Synthesis, computational and structural investigation of unsymmetrical monocarbonyl curcuminoids

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Abstract – Unsymmetrical monocarbonyl curcuminoids are pharmaceutically active compounds. They belong to different families like gingiberaceae and betulaceae. Many of the unsymmetrical monocarbonyl curcuminoids have shown vast biological potential such as anti-inflammatory, anti-cancer, anti-bacterial, anti-microbial, anti-tumor, etc. There is an increasing demand for curcumin, demethoxycurcumin, bisdemethoxycurcumin and other curcuminoids because of their biological activity. So here in we have planned to synthesize unsymmetrical monocarbonyl curcuminoids by using the aldol condensation reaction. All synthesized products will be characterized through melting points, FTIR, IR, ^{13}C-NMR, ^{1}H-NMR and Mass spectrometry an and other available spectroscopic techniques. Moreover, the synthesized compounds will also be SAR studies for their antimicrobial activity.

Keywords – Unsymmetrical monocarbonyl curcuminoids, demethoxycurcumin, Biological activity, FTIR

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Synthesis and characterization of nanocomposite

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Abstract – Due to their exceptional qualities when compared to traditional polymers, polymer-based nanocomposites have garnered a lot of attention. In the current study, poly(1,3-dioxolane) was synthesized using a number of catalysts, although these catalysts are not recoverable. They are not recoverable due to their toxicity and corrosivity, their removal is a serious problem, and their neutralization is highly expensive. In this work, the hazardous acids were replaced with maghnite-H+. a less expensive, non-toxic, and recoverable by simple filtration catalyst based on clay. This study seeks to examine the mass-scale polymerization of 1,3-dioxolane in the presence of succinic and benzoic anhydrides using an ecological framework. Two modified varieties of the mineral, maghnite-CTA and maghnite-Na+, were employed to speed up the production of nanocomposite and are identified by the Fourier Transformed Infrared spectrum (FTIR). Finally, the dangerous acids based on clay were replaced in this study with the use of maghnite-H+. This study seeks to examine the mass-scale polymerization of 1,3-dioxolane in the presence of succinic and benzoic anhydrides using an ecological framework. On the other hand, two altered varieties of the mineral were used to speed up the production of nanocomposite.

Keywords – Maghnite-H+; nanocomposite; Dioxolane; FTIR; Succinic anhydrides.

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Identification and analysis of bridge pathologies. Case study of a road bridge at RN 23 au PK 130+000 in wilaya of Tiaret, Algeria

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Abstract – The duration of use of bridges leads to their ageing and therefore to the loss of some of their characteristics, hence the importance of specialised inspection so that they can perform their function during their assigned service life. This function is not always ensured and it is not easy to diagnose the causes and then take the necessary steps to remedy them by proposing appropriate solutions. The safety of these bridges must also be ensured in view of the increase in the load of the heavy goods vehicles that actually drive over them.

Specialised bridge inspections are required to diagnose the likely causes of the pathologies encountered and to propose appropriate solutions.

Once the causes of the problems have been identified, appropriate solutions can be proposed, such as repair or strengthening of existing structures. It is also important to put in place regular maintenance programmes to monitor the condition of bridges and anticipate potential problems.

This can include visual inspections, non-destructive testing and design analysis to assess the resilience of bridges to actual traffic loads. It is also important to consider current standards and regulations when assessing the safety of existing bridges.

The objective of this research is to assess the condition of the structure located on RN 23 at PK 130+000 in the wilaya of Tiaret (Algeria) and to propose adequate solutions for the different bridge pathologies to be assessed, and to study the hardness and durability of this type of bridge and the impact of the damage it suffers, as well as the extent to which it has evolved over time. The results indicate that, after examination and experimentation, it is resistant to all the pathologies observed and can extend their duration into another period of time.

Keywords – Bridge, Reinforced concrete, pathology, diagnosis, Traffic.

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Fractional ψ-Hilfer Differential Coupled Systems with Infinite Delay

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Abstract – The present study demonstrates the existence of solutions for a specific class of systems with terminal conditions, which involve implicit nonlinear fractional differential coupled systems with ψ-Hilfer fractional derivative and infinite delay. Our method is based on pertinent fixed-point theorems, and we corroborate our results with extensive examples to highlight their significance.

Keywords – ψ-Hilfer fractional derivative, Coupled systems, Existence, Uniqueness, Fixed point, Terminal conditions

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Fixed Versus Random Effect Model

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Abstract – Fixed-effect and random-effect models are statistical techniques used to analyze data from studies that involve multiple groups or observations. The choice between the two models depends on the underlying assumptions about the variability of the data. Many applications of these models have been developed, including in political science, econometrics, biostatistics, sociology, finance, and marketing. The goal of this work is to learn about the concepts of fixed and random effects models when to use fixed effects models, and when to go for (mixed) models and apply these models in R.

Keywords – Regression, fixed effect, random effect, Panel data, mixed effect.

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Synthesis and Characterization of Curcumin/PDMS based Waterborne

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Abstract – One of the major challenges facing the polymer industry now is finding sustainable and renewable alternatives to petroleum-based raw materials. To overcome such challenges, these novel waterborne polyurethane dispersions will be prepared from Curcumin. Waterborne polyurethane dispersions will be synthesized by reacting the hydroxyl terminated polybutadiene (HTPB) with toluene diisocyanate (TDI) and dimethylol propionic acid (DMPA) to form the polyurethane prepolymer, which further reacts with polydimethylsiloxane (PDMS) and curcumin (as chain extenders), and the final product will be obtained by the addition of water. Fourier transform infrared analysis (FTIR) will be used for the structural confirmation of the prepared curcumin based polyurethane dispersions. A number of textile tests, including mechanical (tear strength, tensile strength) and colorfastness (such as washing, rubbing, perspiration) will be conducted on poly/cotton fabrics after applying the synthesized dispersions by pad dry-cure method.

Keywords – curcumin based polyurethane, poly/cotton fabrics, hydroxyl terminated polybutadiene, Biological activity

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Contribute to reducing the environmental damage caused by the oil well sands through its use in concrete under the cover of innovative concrete

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Abstract – The oilfields of southern Algeria suffer from the problem of sand collection resulting from drilling and oil exploration operations, similarly, oil companies in these areas are concerned about the lack of sand and the distance of sand appropriate to the construction. In relation to the location, for their use in certain constructions related to the nature of their work. Several international studies have been conducted, most of which indicate the risk of leaving the drilling fluid and sand mixed with it if neglected in the exploration areas. In addition to helping to improve the mechanical and physical properties (compressive strength, flexural strength) of oil well sand concrete.

Within this idea, we decided during this study to try to answer the possibility of using oil well sand as an alternative, even partial, in the construction to reduce these phenomena and the problems that arise in the surfaces of these regions.

According to the most important results obtained, namely a significant improvement in compressive strength, we propose to develop and improve the oil well sand concrete, in order to achieve the generalization of the use of these huge quantities of this sand located in the southern region in the field of construction, as well as the elimination of environmental pollution, and that in the medium and long term.

Keywords – oil well sand, environmental, drilling fluid, sand concrete, flexural strength, compressive strength, innovative concrete

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Methyl Violet 2B Discoloration by Adsorption on Activated Carbon Based on Natural Carob

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Abstract – Water pollution caused by textile dyes in industrial waste has become a pressing issue. To address this problem, we have developed an activated carbon adsorbent from natural carob, the fruit of the Ceratonia siliqua L tree, found in Algeria. Our study aims to investigate the properties and performance of the adsorbent and its effectiveness in removing methyl violet 2B (MV2B) dye from wastewater under different parameters. We varied the adsorbent weight, initial dye concentration, pH, temperature, stirring speed, and contact time to determine optimal conditions for adsorption. Our results show that the optimal conditions for adsorption were found at 50mg of adsorbent weight, 10ppm initial dye concentration, pH of 9, 20°C temperature, and stirring speeds between 200 and 300 rpm. The activated carbon exhibited high absorption capacity, removing 98% of MV2B dye at an initial concentration of 10 mg/L. The adsorption process is exothermic, spontaneous, and well-modeled by the pseudo-second-order, S-sigmoid isotherm, and Langmuir or Temkin models.

Keywords – Carob (fruit of Ceratonia siliqua L), Adsorption, Activated carbon, Methyl violet 2B (MV2B)

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Intercalated clay as efficient adsorbent for congo red from wastewater

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Abstract – In this work, we studied the adsorption of an acid dye, Congo red, in aqueous solution on raw and intercalated clay in batch mode. Adsorption tests have shown that equilibrium is established after 120 minutes. The experimental results showed that the adsorption of Congo red dye on raw and intercalated clay depends on the pH of the solution. The adsorption kinetics of Congo red was studied using the pseudo-first order, pseudo-second order, intra-particle diffusion and Elovitch equations. The effect of temperature on dye adsorption was also studied. L'adsorption du colorant rouge congo sur l'argile brute et intercalée peut être décrite par les cinétiques de pseudo-second ordre et d'Elovitch.

Keywords – adsorption, intercalated clay, congo red

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Power Management Based on PWM-inverter Current Calculation of a Solar Energy Conversion System

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Abstract **–** The aim of this paper is the management of active power generation, reactive power compensation and power quality of SECS (Solar Energy Conversion System), while guaranteeing the possibility of exploiting the full capacity of the Power Conditioning System (PCS) and the PV generator. Firstly, the whole system upper limits of active and reactive powers have been determined in the (PQ) power plane on the basis of PV generator available power, converters rated power and DC bus voltage smoothness and stability. Then, a novel control is dedicated to manage the SECS function's priorities, between main active power generation, reactive power compensation and active filtering in such a way to guarantee a smooth and stable DC voltage and ensure a sinusoidal grid current. Top priority is given to the active power production over power quality improvement. This control procedure is based on the calculation of the inverter current commands in order to exploit the full capacity of the SECS and avoid the system components over-rating or instability. Simulation results show the performance of this control strategy and prove that the SECS can operate at its full power capability.

Keywords –PV system, Power limitations, PWM-inverter, Current commands calculation, Capability of the SECS

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Deterioration of tensile module of composite materials used in marine structures affected by time of saltwater absorption A review

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Abstract **–** polyester/glass composite materials have improved the marine and defense fields by supporting manufacturing of several structures due to their superior properties.
Therefore, the goal of This study was to present the properties, characterization of materials and applications of materials, based on polyester matrix and fiberglass.
This Study covers the applications of GFRP composites in the maritime industry and their development over time ; describe the diffusion interactions of seawater in polyester/glass, study of information on the damage mechanisms of polyester/glass composites in the ocean environment, However, This paper investigates the effects of saltwater ageing time on the tensile properties of composite, we will study the different researches and results in previous researches of corrosion in exposure duration ; Long-term and short-term .
In the present study, durability of a polyester/glass GFPP was investigated under seawater environment at difrent time of absorption (1moi - 2moi - 3moi - 4moi - 6moi …….)
The results indicated that :
-GFPP is highly susceptible to Long-term immersion in seawater
-At the same time, the retention of tensile strength after immersion for a long time is lower than that of the material before immersion
-The tensile strength and failure strain reduce with increasing exposure time.

Keywords – marine structures, Time, Seawater, , tensile module, composite

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Depollution of contaminated water. Comparative study between biosorbent and activated carbon

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Abstract – The question of water, a recurring problem, is one of the most strategic of our time and the most difficult because it is associated with life and is not the product of man. As a result, water pollution, accidentally or deliberately, becomes a universal scourge leading not only to environmental degradation but also to a reduction in water quality while constituting a threat to public health.

We are interested in water resources polluted by an organic substance which is Methylene Blue and which constitutes an important source of pollution, and is essentially the result of discharges from industrial textiles. To reduce the harmful effects of this pollution on the environment and human health, several wastewater treatment processes are implemented, in particular the adsorption process.

Our study presents a double environmental aspect, on the one hand a recovery of vegetable waste in this case the leaves of Lentisc, and on the other hand, the study of the adsorbent efficiency of the activated carbon resulting from these leaves.

The objective of this study is to determine the adsorbent power of a biosorbent as well as its activated carbon by chemical agent, vis-à-vis methylene blue (BM) in an aqueous medium. The adsorption tests made it possible to optimize a certain number of operating conditions, namely: the contact time, the mass of the adsorbent, the temperature and the pH.

The adsorption phenomenon governing this process is described by the Langmuir model, and shows that the adsorption capacity of activated carbon is relatively higher than that of biosorbent.

The results obtained show that the coals used are an excellent example of the economic use of vegetable waste for the protection of the environment without any inconvenience.

Keywords – Activated carbon, pollution, methylene blue, adsorption

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Thermo-viscoelastic problem with long memory

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Abstract – We consider a dynamic contact problem with friction in thermo-viscoelastic constitutive law with long memory, modeled by friction with sub-differential condition, The problem is formulated as acoupled system of an elliptic variational inequality for the displacement and the heat equation for the temperature. We establish a variational formulation for the model and we prove the existence of a unique weak solution to the problem. The proof is based on a classical existence and uniqueness result on parabolic inequalities, dierential equations and fixed point arguments..

Keywords – Thermo-viscoelastic, long memory, sub-differential, weak solution, fixed point.

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Effect of alkaline treatment on the morphological and mechanical properties of two composites: Iso-type and Ortho-type Unsaturated Polyester reinforced with Alfa fibers

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Abstract **–**Alfa fibers have been used to replace glass and carbon fibers, which have a very high cost which influences the cost price of the finished product. The objective of this work is to prepare a material based on an unsaturated polyester reinforced with Alfa fibers treated with 5% NaOH for 1, 3, 5 and 24 h. The effect of the alkaline treatment on the mechanical behavior is significant. FTIR characterization of Alfa fibers showed that the quantity of hydroxyl groups (-OH) decreased and the crystallinity index increase by 33 % after alkali treatment. According to tensile test, the treated composites showed better mechanical performances compared to their untreated counterparts. Furthermore, the flexural modulus was also improved by 38 % compared to the untreated. The alkali chemical treatments modified the Alfa fiber which improved the fiber–matrix adhesion.

Keywords – Alfa fibers, composites, chemical treatment, tensile test, mechanical properties.

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Effect of mineral additions on the behavior of sand concrete heat treated

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Abstract **-** The objective of this work is to study the effect of substitution of cement weight by mineral additions, such as natural pozzolan and limestone filler on the mechanical properties and durability of sand concrete cured under high temperatures curing temperature ranging from 50 to 90°C. The results of this study showed that it is possible to manufacture sand concrete using mineral additives with acceptable fresh and hardened properties. The increase in the curing temperature leads to an improvement in the performance of sand concretes at a young age without significantly harming its long-term properties.

Keywords – Mineral addition, Sand concrete, Substitution, Temperature, performance.

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The product integration method of fredholm integral equation

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Abstract **–**Considered is a second kind Fredholm integral equation in $L^1([a,b]\times[c,d],\mathbb{R})$ with a weakly singular kernel. The existence and uniqueness of the answer are sufficiently predicated. In order to apply the product integration technique suggested in $L^1([a,b],\mathbb{R})$ in $L^1([a,b]\times[c,d],\mathbb{R})$, we modify it and discretize the equation. We employ various iterative refinement strategies, which we compare to one another to increase the accuracy of the estimated result. The numerical support is provided via an astrophysical application.

Keywords – Fredholm integral equation, weakly singular kernel, the product integration.

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Predicting the Efficacy of Novel Shikonin Derivatives Against Colon Cancer Using QSAR Modeling

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Abstract – The number of people experiencing various forms of cancer-related ill and cancer casualties has been on the rise in recent years. Therefore, endeavors are made in fields related to cancer in order to tackle this evolution or reduce the number of death cases caused by cancer. The aim of this paper is to present the result of QSAR study of shikonin based derivatives that has been found to exhibit significant anticancer activity against colon cancer. The study showed that the bioactivity of the aforementioned derivatives against colon cancer can be predicted accurately, by using appropriate data analysis tools that are capable of capturing the relevant pattern in QSAR data, based on the molecular structure of the synthesized derivatives. This paper is supposed to help accelerate the drugs discovery process for targeting different cancer-types, including colon cancer.

Keywords – QSAR, machine learning, cancer, drug design, molecular descriptors.

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Phytochemical Investigation And Biological Activities Of The Species *Erinacea Anthyllis* Link

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Abstract – The genus *Erinacea* belonging to the subfamily Papilionoideae of the family Fabaceae, is represented by a single species named *Erinacea anthyllis* Link or *Erinacea pungen*. This species is a shrub with purplish blue flowers that is found mainly in the Pyrenees Orientales in France, Spain, Algeria, Tunisia and Corsica. In Algeria, this species is used in traditional medicine to treat rheumatic diseases. The present work describes the isolation and structural elucidation of two new prenylated isoflavonoids namely: Erinasone A and Erinasone B, together with 10 known compounds from the EtOAc extract of *E. anthyllis*. Structures of all the isolated metabolites 1-12 were established mainly by spectroscopic analysis, measurement of optical rotation [α]D and by comparison with the literature data. The total phenolic and flavonoid contents were quantified by Folin-Ciocalteu and trichloroaluminum methods respectively. The antioxidant activity of the EtOAc extract and the isolated compounds was determined by three different methods including trapping of the free radicals DPPH, FRAP and PPM assays. In addition, the antibacterial activity of EtOAc extract and the isolated products was evaluated against three strains. The results of the antioxidant activity revealed that the EtOAc extract and the isolated compounds possess moderate antioxidant activity for all the tested methods. Both, new compounds Erinasone A and Erinasone B showed good antibacterial activity against all the tested strains. Consequently, *Erinacea anthyllis* is a rich source of polyphenolic compounds particularly isoflavonoids used as chemotaxonomic markers for the subfamily Papilionoideae.

Keywords – Erinacea anthyllis, Isoflavonoids, Bioactive contents, Antioxidant activity, Antibacterial activity

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An Amended Version of Salp Swarm Optimization using Chaos Theory

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Abstract – The salp swarm algorithm (SSA) is a recently created bio-inspired optimization algorithm introduced in 2017, which is based on the swarm crowding mechanism and shows certain advantages in solving some optimization tasks. However, with the increasing difficulty of solving the problem (e.g. multi-modal, high dimensional), the SSA algorithm's convergence accuracy and stability decrease. In order to overcome the barriers, this work introduces an improved negative swarm algorithm, which optimizes SSA by using a chaotic sequence strategy, and this enhanced version of SSA is called CSSA. The algorithm is evaluated on several numerical standard functions and is compared with SSA. The comparative results show that the chaotic maps significantly enhance the performance of the SSA algorithm.

Keywords – Optimization, Swarm Intelligence, Salp swarm algorithm, Chaos, Chaotic maps.

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Durability of sand concrete based on mineral additions

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Abstract **-** This work consists in the study of the evolution of the durability of sand concrete containing two additions minerals (dune sand and silica fume) in two conservation media (open air, tap water).
The first step of our study is the characterization of the constituents used in the perfection of the sand concretes, then we study the effect of adding silica fume with a percentage (3%) and dune sand (8%, 16%) and the combination between two additions.
Thus tests of compressive and tensile strength at 7,14,28 days are carried out in order to estimate and evaluate this durability.

Keywords – Durability, Sand concrete, Mineral additions, Dune sand, Silica fume.

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Self-Organizing Maps and sound perception in the monitoring of the bearing degradation

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Abstract – This study aims to monitor and detect bearing defects from measured signals on a wind turbine during 50 operating days using two methods. The first method involves a perceptual approach to classify the selected signals based on 50 measurements. The second method used is an unsupervised classification method called the Self-Organizing Map (SOM). Overall, the perceptive approach proved to be simple and effective compared to conventional methods of treatment and diagnosis of defects, as listeners were able to classify the selected sounds in the order of bearing degradation, allowing the severity of the bearing defect to be tracked. Furthermore, the neural classifier provided relevant information on the evolution of bearing degradation, as it could automatically cluster the vibration signal into four groups corresponding to the bearing life stages. Thus, these results can effectively contribute to well-timed maintenance decisions. In addition, the advantages and deficiencies of one method over the other are briefly discussed in this paper.

Keywords – Sound perception, bearing defect, self-organizing maps, wind turbine, defect diagnosis, conditional monitoring.

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Microscopic Degradation Study of Carbon Composites for Orthopedic Structures

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Abstract – Our university research project, in collaboration with a company specializing in orthopedic prosthetics, aims to improve the performance of its devices. Our research involved preparing carbon-orthocyl composite samples and testing them mechanically to determine their properties. For this purpose, we performed static tensile tests. To gain a better understanding of the material, microscopic examinations were performed to identify various degradations caused by the application of static stress. The results of the microscopic examination showed that the material had suffered all the degradation known from the inspection of composite materials. We calculated resin breakage, intralaminar, interlaminar and interlaminar delamination, debonding and fiber breakage. All this deterioration has several causes that we have to look for in order to improve the performance of the prosthesis. We have noticed poor wetting between fibers and resin. It is important to note that resin and fiber are supplied by the same supplier. We are currently studying the impact of impression technique.In conclusion, we can say that despite the various degradations caused by the influence of static traction, carbon-orthogonal acrylic composites maintain a good resistance.

Keywords – Carbon composites, Delamination, orthopedic, interlaminar, Acrylic resin

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Soxhlet extraction of phenolic compounds from *Cynara cardunculus L* waste (leaves and stems) and its antioxidant activity

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Abstract – The main interest of the valorization of vegetable waste is due to the peculiarity of their chemical composition in substances that present important properties. Among these substances, we mention the antioxidants, which can replace those manufactured industrially. The objective of this work is to compare the yields of phenolic compounds of leaves and stems of cardoon waste, focused on the valorization of lignocellulosic waste, and on the antioxidant activity of the extracts. Thus, a study of the extraction of compounds from these wastes by soxhlet is presented. The extraction yields are estimated using three extracting solvents, namely hexane, ethanol and water. The characterization of the extracted phenolic compounds is performed by Fourier transform infrared spectroscopy and spectrophotometric assays. The antioxidant activity of these extracts is evaluated. The obtained results reveal that high extraction yields are obtained by water for leaves and stems. And these extracts showed high total antioxidant activity.

Keywords – Waste, Extraction, Antioxidant, Environment, Soxhlet, Cardoon.

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Effect ofhemical treatment on the behavior of polylactic acid/Diss (Ampelodesmosmauritanicas) composite

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Abstract - The interest in the use of natural fibers as a reinforcing agent in thermoplastic polymers attracts the attention of many researchers in the conquest of new materials and the improvement of the properties of those already existing in the field of science. materials and technology. The incorporation of vegetable fibers contributes effectively to the preservation of the environment and the reduction of pollution generated by non-degradable polymers and to replace them with biodegradable composites (polymer/vegetable filler). However, polymer-based composites require specific treatments to ensure minimum compatibility within the matrix/fiber mixture. This work plans to study the effect of chemical treatment (alkali treatment, esterification treatment and etherification treatment) and elucidate the modification mechanisms that occur on the surface of the fiber in Diss and measure its impact. on the mechanical and thermal properties of composites. The percentage of fibers was set at (20%). Composites containing chemically modified Diss fibers show a marked improvement in their mechanical and thermal properties compared to untreated composites.

Keywords Diss, polylactic acid, mechanical properties, thermal properties, surface modification, chemical treatment.

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Electrochemical and spectroscopic characterization of a new nanocomposite based on organic polymer conductors / CNTs / nanoparticles and the study of the effect of electrode material for the detection

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Abstract – Multi walled Carbon nanotubes is very important for living beings to live and prosper Multi walled Carbon nanotubes (MWCNT) is carbon's one of the most latest discovered forms that's useful. It is a structure of molecular-scale, containing atoms of carbon joined by covalent bonds, arranged in one or more cylindrical layers, bonded in a pattern of hexagonal tiling. A novel nanocomposite based on organic polymer conductors / MWCNT/ nanoparticles. The electrocatalytic performances of this modified electrode particles were established. The effect of electrode material for the detection are reported in this study alsow.. The films were characterized by cyclic voltmeter (CV) and he shows an increase in peak intensity corresponding to oxidation and reduction during of the formation of the film. Electrochemical impedance spectroscopy (EIS) also shows the decrease of the resistance of composite materials. Structural and morphological characteristics of the composite film have been studied by scanning electron microscope (SEM). The MWCNTs were observed to be well dispersed in the polymer matrix. Crystallites were found to be more ordered barely affecting the lamellar structure of polymer in the nanocomposite film. Structural and functional characteristics of polymer and its hybrid nanocomposite have been studied by UV -Visible (UV -Vis), Fourier transform infrared (FTIR). Excellent electrical properties have been observed from I -V and cyclic-voltammetric characterization of the well dispersed MWCNT in the polymer composite.This proposed modified electrode can be used for the electrocatalytic detection of different biological molecules and heavy metals.

Keywords –Multi walled Carbon nanotube; detection; organic polymer conductors; characterization

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Insight into Structural, Electronic, Magnetic and Elastic Properties of Full-Heusler Alloy Co_2 Ti Pb

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Abstract – In the present paper, we have engaged ab-initio density functional theory within the full-potential linearized plane wave method [1] to investigate Heusler alloys Co_2YPb (Y=Ti, V, Fe and Mo) for electronic structure, mechanical stability and thermo-electronic possessions. This is based on density functional theory (DFT) [2] implemented in the wien2k code [3] with Generalized Gradient Approximation (GGA) [4]. For exchange and correlation potential, we have applied a modified version of the potential proposed by Becke–Johnson (mBJ) to our compounds in order to improve the band-gaps and approach them for experimental results. The electronic and magnetic properties results in both GGA and mBJ-GGA [5] show that the full-Heusler Co_2YPb (Y=Ti, V, Fe and Mo) are half-metallic ferromagnetic (HMF) compounds. The results obtained showed that the Cu_2MnAl-type structure has more stable Energy than the Hg_2CuTi-type structure for all the full-Heusler studied.Furthermore, we also found that all materials have integral magnetic moments which are mainly due to 100% spin polarization at Fermi energy, thus it well agreement with the Slater-Pauling base. Finally, the calculated elastic constants and the anisotropy shear factors indicate that these compounds are a ductile character and are mechanically stable.

Keywords – Ab initio, Full Heusler compound, Half-metallic Spin polarization, Elastic Properties

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Investigation of new half-metallic full-heusler alloy Co_2FePb : Insights from ab initio study

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Abstract – In this work, we present the structural, electronic magnetic and elastic properties of the half-metallic ferromagnetic Heusler compound Co_2FePb. We have applied the full-potential linearized augmented plane waves (FP-L/APW) method based on the density functional theory (DFT) as implemented in code Wien2k. For the exchange and correlation potential generalized-gradient approximation (GGA) is used. The total spin moment is 6.000 μB per formula unit in equilibrium state, which follows the Slater-Pauling rule. The spin-up electrons are metallic, whereas the spin-down bands are semiconductor with a gap of 019 eV. We have also computed the three elastic constants (C_{11}, C_{12} and C_{44}). The elastic modulus and their pressure dependence are calculated. From the elastic parameter behavior, it is inferred that this compound is elastically stable and ductile in nature. Our results indicate that Mn2MgGe is an interesting candidate in the area of spintronics.

Keywords – Ab initio ; Density functional theory ; Magnetic properties · Elastic Properties ; Half-metallic property ; spintronics

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Use of *Aloe vera* as Bio-Coagulant for Wastewater Treatment

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Abstract- The presence of various pollutants in the water imposes the treatment of this water before use, to improve its quality, several treatment processes have been used such as mechanical (screening), biological (aerobic or anaerobic), physico-chemical (Coagulation flocculation)...etc,. The latter allows to reduce of total suspended solids (TSS), the colloidal particles, the chemical oxygen demand (COD), the total organic carbon (TOC) and the water turbidity.

In this work, we used Aloe Vera extract as a natural coagulant to improve wastewater quality. This liquid coagulant was obtained after the preparation of Aloe Vera powder with distilled water;

Several results were obtained as example, for example, the maximum reduction in turbidity , organic matter (OM), total carbon (TC), inorganic carbon (IC) and total organic carbon (TOC) were 93.08 ; 5.39; 18.15; 19.49; 10.14% respectively.

When using the test jar, different water parameters were measured, namely pH, total alkalinity, TSS and sludge volume.

Keywords : Natural coagulant, organic pollution, wastewater, jar test, turbidity.

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Use of Cactus-Based Bio-Polymers to Improve Drinking Water Quality

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Abstract – The use of a single coagulant does not always result in good coagulation flocculation. The use of a coagulant helper improves the performance of the coagulation-flocculation process.
In this work, the bio-polymer based on Cactus leaves was used as coagulant aid. The jar test results show that the maximum reduction in turbidity and TSS was 92.10% and 76.47%, respectively after the treatment with aluminum sulfate. The addition of Cactus increased the yield of coagulation flocculation, in this case the percentage of removal in turbidity and TSS were 94.52% and 82.35%, respectively.
During the realization of jar test, several water parameters were evaluated such as pH, organic matter, alkalinity, total hardness, dry residue, total organic carbon....etc.
In this study, the types of bio-polymers in the Cactus were identified using several techniques and devices such as FTIR, XRD, SEM and Zeta meter,...etc

Keywords – Cactus, Bio-polymer, aluminum sulfate, coagulation, flocculation, turbidity.

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Study of the heat exchange process during the cooling of an electronic chip using magnetic nanoparticles and magnetic field inducer

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Abstract – In this study, the effect of a magnetic field inducer on the cooling process of an electronic chip using magnetic nanoparticles was investigated. To do this, a numerical analysis using the finite volume method was performed. Simulation results were presented in terms of isotherms, streamlines and mean Nusselt number. The results showed that the use of magnetic nanoparticles significantly improved the cooling process, as they acted as a heat transfer enhancer. Moreover, the application of the magnetic field remarkably improved the heat transfer quality, which resulted in a higher average Nusselt number. Moreover, as the intensity of the magnetic field increased, the rate of heat transfer also increased and the uniformity of heat transfer improved. The results of this study have potential applications in the design of advanced cooling systems for electronic devices. Further research in this area is warranted to explore the potential of magnetic nanoparticles and magnetic fields as heat transfer enhancers.

Keywords – Heat exchange; Cooling; Electronic chip; Magnetic field

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Caputo-Fabrizio fractional differential equations in fréchet spaces

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Abstract **–** This paper deals with some existence and uniqueness of solutions for a class of functional Caputo-Fabrizio fractional differential equations. Some applications are made of a generalization of the classical Darbo fixed point theorem for Fréchet spaces associate with the concept of measure of noncompactness. The last section illustrates our results with some examples.

Keywords – Fractional differential equations, Caputo-Fabrizio integral of fractional order, Caputo-Fabrizio fractional derivative, Fréchet space, fixed point.

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Seizure onset prediction based on MLP and RNN

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Abstract – Epilepsy is prevalent neuroscience research that patients suffer from uncontrolled of seizures in brief time. However, machine learning has an important role in seizure prediction based on EEG recorded signals. Predicting a seizure before it actually occurs can help in its prevention. Thus, the main challenge in seizure prediction is to identify the preictal state. This study suggests a model for this problem to predict the occurrence of an epilepsy onset by using ML. Method's steps are begging by preprocessing of scalp EEG signals. Then, discret wavelet transform (DWT) is used for features extraction. All features extracted are then input to the ML model. Here for the prediction of seizure onset, multilayer perceptron neural network (MLP) and Recurrent neural networks (RNN) are used to distinguish between the interictal and preictal state. The proposed method has been applied on scalp EEG signals of CHBMIT dataset (10 cases). The obtained results with high accuracy achieving an average of 90.075% for MLP and 97.76% for RNN. Finally, it is demonstrated that RNN perform better than MLP, thus, this work outperforms the most of previous studies and can predict an epileptic seizure onset successfully.

Keywords –CHBMIT dataset, EEG recorded signals, Interictal state, Preictal state, Seizure prediction

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Influence of Pozzolanic Materials and Fibers on Mechanical and Microstructural Properties of Concrete

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Abstract **–** This study addresses improving concrete quality and reducing environmental impact by exploring the effects of Shape Memory Alloy (SMA) fibers and Ground Granulated Blast Furnace Slag (GGBS) on Recycled Aggregate Concrete (RAC). While individual impacts of these materials are known, their combined effects on RAC's mechanical and microstructural properties, particularly after cracking, remain underexplored. Over 28 days, workability, specific gravity, and ultrasonic pulse velocity (UPV) were measured, and SEM analysis assessed microstructural characteristics. Consistent hydration products like gypsum, ettringite, calcium hydroxide, and calcium silicate hydrate were observed. Results show that SMAs enhance the mechanical and microstructural properties of GGBS-containing RAC, improving durability, thermal regulation, ductility, and crack control.

Keywords – Concrete, fibers, ultrasonic pulse velocity, Scanning electron microscopy (SEM)

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Farklı Tuz Konsantrasyonlarında Geliştirilen Patlıcan Anaçlarının Fenotipik Kök Mimarisi Yönünden İncelenmesi

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Özet **–** Tuzluluk, daha çok kuraklığa bağlı olarak yetiştiriciliği sınırlandıran ve ürün verimini olumsuz yönde etkileyen stres faktörlerinin başında yer almaktadır. Son yıllarda yapılan çalışmalar, aşılı fide kullanımının, bitkide tuz stresi zararını azalttığını göstermektedir. Bu çalışma ile farklı tuz konsantrasyonlarında geliştirilen patlıcan anaçlarının fenotipik kök mimarilerinin belirlenmesi; genotipler arasında tuza tolerans bakımından oluşan varyasyonun ayrıntılı olarak ortaya konulması amaçlanmıştır.

Çalışmada genetik materyal olarak 8 adet türler arası hibrit patlıcan anaç adayı (*Solanum melongena* x *Solanum aethiopicum*) kullanılmıştır. Ayrıca kontrol çeşit olarak ülkemizde aşılı patlıcan fidesi üretiminde yaygın olarak kullanılan AGR-703 F1 ve AGR-704 F1 ticari patlıcan anaçları ve kalem olarak kullanılan Karabey F1 çeşidi de araştırmada değerlendirilmiştir. Denemede, 5 farklı sulama suyu tuzluluğu (kontrol, 2, 4, 6 ve 8 dSm^{-1}) uygulanmıştır. Anaçların köklenme düzeylerinin belirlenmesi amacıyla WinRhizo kök analiz programı (Regent Instrument Inc. Canada) kullanılmıştır. Yapılan kök analizi sonucunda kök uzunluğu (cm), kök yüzey alanı (cm^2), kök hacmi (cm^3) ve kök çapları (mm) değerlendirilmiştir.

Kök özellikleri, tuz stresine bağlı olarak önemli ölçüde değişiklik göstermiştir. Tuz konsantrasyonunun artışıyla birlikte anaçların kök uzunluğu, kök yüzey alanı ve kök hacmi azalırken kök çapında artış gözlemlenmiştir. Özellikle RS-5 anacı ile aşılanmış bitkiler, ortalama kök çapında (5,20 mm) en düşük değeri alırken, kök uzunluğu (716,78 cm) ve kök yüzey alanında (1053,97 cm^2) en yüksek değerleri göstermiştir. Sonuç olarak, RS-5 anacı tuz stresine karşı en yüksek dayanıklılığı sağlayan genotip olarak ön plana çıkmıştır. Bu genotip, özellikle tuzlu toprak koşullarında kullanılabilecek bir anaç adayıdır. Çalışma, tuz stresine dayanıklı anaçların seçiminin ve aşılı fide kullanımının, stres koşullarında verimliliği artırmak için etkili bir strateji olduğunu göstermektedir.

Anahtar Kelimeler – tuz *stresi, patlıcan, anaç, kök sistemi mimarisi*

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A Hybrid Machine Learning Approach for Multiclass Brain Tumor Classification Using EfficientNetB0, SVM, and PSO Optimization

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Abstract – Brain tumor classification is critical for accurate medical diagnosis. This study introduces a hybrid machine learning approach that combines EfficientNetB0, Support Vector Machines (SVM), and Particle Swarm Optimization (PSO) to classify brain tumors from MRI images. The approach utilizes a dataset of 5,712 images spanning four categories: pituitary tumors, meningioma tumors, glioma tumors, and normal brain. EfficientNetB0 was used for feature extraction, SVM for tumor classification, and PSO to optimize the penalty parameter C of the linear SVM, enhancing both accuracy and efficiency in brain MRI scan classification. The proposed model achieved an impressive accuracy of 99.21%. By outperforming traditional Convolutional Neural Networks, this method demonstrates significant potential for automated and precise brain tumor detection, offering a promising solution to enhance medical image analysis.

Keywords – Brain tumor classification, CNN, Ensemble, MRI, SVM, PSO

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Evaluation of hardness, porosity, density and shrinkage property of Natural ceramic: High temperature effect

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Abstract – In this work, the sintering behavior of Algerian natural phosphate raw from the Jebel El Onk region of Tebessa was studied at temperatures ranging from 1000˚C to 1400˚C in air. The effects of temperature on the densification, porosity, shrinkage and Vickers hardness of the raw material were evaluated. Upon heat treatment at 1200˚C, a high density of phosphate was determined while higher temperatures allowed better porosity formation of natural phosphate. Shrinkage measurements are consistent with thermal analysis results. High heat treatment has a positive effect on the hardness of the phosphate grains.

Keywords – natural phosphate, porosity, density, sintering temperature, bioceramic.

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Study of Drug Stability Through Statistical Analysis

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Abstract – The stability study of a pharmaceutical product is a crucial regulatory requirement for obtaining marketing authorization.

This study assessed the stability data of the product in alignment with the ICH Q1E guidelines, aiming to determine its shelf life and optimal storage conditions. The findings were as follows:

The accelerated stability tests conducted on three batches revealed no significant changes. However, a statistical analysis of the long-term data indicated both a time-related change and variability among the batches. Using MINITAB software, the minimum estimated shelf life was calculated to be 17.511 months. Based on these findings, a shelf life of 18 months is proposed for this product, under standard ambient conditions of temperature and humidity.

Following registration, the Marketing Authorization (MA) holder is required to continue the long-term stability study to ensure it spans at least the proposed shelf life.

Keywords – Stability study, ICH Q1E, ANCOVA, MINITAB software.

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INTEGRATING BUILDING INFORMATION MODELLING WITH CONSTRUCTION

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Abstract **–** Building Information Modeling (BIM) has revolutionized the construction industry by encouraging communication and improving project performance. The research highlights utilization of BIM in industrial plant fabrics. It investigates procurement issues, challenges, and opportunities for improvement in the areas. Through semi-structured interviews, questionnaires and real time field application of BIM implementation with, the study reveals BIM plays an excellent role when it comes to communication and teamwork as it can give real time data sharing and working. Though these obstacles to BIM adoption, namely, expensive initial costs, organizational resistance, or technical complexity, are still to be solved, the technology has a future in construction. The study indicates that proper BIM introduction in the industrial factory construction includes staged implementation, strong management support, and full-scale training. The study provides recommendations on dealing with cost as well as resistance aspects of technology adoption, underscoring the role of effective communication using personal context. Even though there is a self-limitation in sample size and geographical focus, this research will create a framework for better BIM uptake in the industrial sector. Through this research our observations can be added to the knowledge bodies about the special features of BIM application in industrial facility construction and the road may be open for others who will study applicable fields in industrial construction and long-term impact.

Keywords: *Building Information Modeling (BIM), Construction, Project Efficiency, Collaboration, Lifecycle Management, Implementation, Stakeholder.*

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Effect of cation doping on bioceramics' microhardness, density, and porosity characteristics

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Abstract – In this study, bioceramic was synthesized by a precipitation method and doped with Mg^{+2}/Zn^{+2} ions and in order to investigate its physical and mechanical properties. The effect of magnesium and zinc doping content on the densification, porosity and Vickers hardness of the hydroxyapatite was evaluated. The density and hardness of magnesium-doped hydroxyapatite improved better than the zinc-doped samples. On the other hand, the porosity of ceramics decreased by 9.84% and 14.6% by adding zinc and magnesium, respectively.

Keywords – hydroxyapatite, porosity, density, cationic-doping, bioceramic

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Leveraging Digital Transformation in English Language Education

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Abstract – This paper reports how digital transformation in English language education can expand climate crisis awareness, bridging global divides and fostering climate-conscious learners. It emphasizes the need to integrate climate change topics into English curricula through online platforms, virtual classrooms, and simulations. Although interdisciplinary approaches to environmental education have been explored, few studies have embedded climate discussions within language learning. This study addresses that gap by investigating how digital tools can enhance both English proficiency and environmental awareness. Data was collected through pre- and post-assessments of English proficiency and climate knowledge, along with focus group interviews capturing student feedback. The curriculum developed integrates climate topics into English lessons using virtual simulations and interactive platforms to strengthen language skills and environmental literacy. This approach provides access to high-quality education across geographical barriers, engaging a diverse global audience. Findings show that students improve their English while gaining a deeper understanding of climate issues, empowering them to take climate action locally and globally. The research underscores the importance of innovative digital strategies in education to address the climate crisis.

Keywords – digital transformation; climate crisis; English Language education; digital tools, awareness

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Pedagogical Issues in Implementing Digital Education

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Abstract – The implementation of digital education across countries like Malaysia, Laos, and Cambodia presents unique pedagogical challenges influenced by diverse educational environments. This study identifies and analyzes key issues such as inadequate teacher training, uneven access to technology and internet connectivity, lack of curriculum adaptation for digital platforms, challenges in assessment integrity, and inequity in digital learning. Additionally, it highlights the gaps in digital literacy and strategic policy shortcomings. Leveraging insights from the DX.SEA project and other regional studies, this paper emphasizes targeted interventions, including professional development in digital literacy, infrastructural investments, innovative curriculum designs, and strategies for equitable access. The findings aim to guide policymakers and educators in building sustainable digital education ecosystems in Southeast Asia.

Keywords – Digital Education, Pedagogy, Equity, Technology Access, Digital Literacy, DX.SEA, Southeast Asia

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Synthesis of New cooper *N* –heterocyclic carbenes complexes

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Abstract – The Cu-NHC complexes moiety is a useful synthon in biomedical chemistry and can be found in a wide range of therapeutically active molecules. [1-2] We focused our study for the conception and the synthesis of a new series of cooper (I) *N*-heterocyclic carbene complexes which were obtained from the corresponding *N*-heterocyclic carbene (NHC) precursors and their unsymmetrical benzimidazolium salts.[3]

Keywords – N-heterocyclic, carbene, (NHC), benzimidazolium salts, cooper (I).

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In-silico ADME and molecular docking investigations of a new quinoline derivative

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Abstract – Quinolines are well known heterocyclic compounds and have been used successfully in many pharmacological and medicinal fields owing to their interesting biological properties; such as: anticancer, antimalarial and antibacterial. In this work, we report ADME prediction and molecular docking (MD) of new derivative featuring sulfonamide moiety (SO_2NH_2), *i.e.* 2-(2-hydroxyphenyl)quinoline-6-sulfonamide (HPQS). Drug-likeness and pharmacokinetics parameters revealed that the compound exhibited favourable ADME properties. In addition,molecular docking study was carried out to investigate the possible binding mode of the quinoline derivative, and revealed strong interactions between HPQS and the active site of the enzyme dihydropteroate synthase of *E. coli* (pdb ID: 1AJ0),with a high binding score. Considering the findings of the study, it has been proven that this new compound constitutes a promising therapeutic agent capable of managing bacterial infections.

Keywords – Quinolines; drug-likeness, ADME properties and molecular docking

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Secure Medical Image Encryption Scheme Based on RoundKey and 2-Level Permutations

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Abstract: The rapid digital transformation in healthcare has intensified the need for secure transmission and storage of sensitive medical images to safeguard patient privacy and comply with stringent regulatory frameworks. In this paper, we propose a secure medical image encryption scheme that leverages the RoundKey generation and two-level permutation techniques to ensure the confidentiality and integrity of sensitive medical data. The scheme incorporates the rekeying mechanism to generate dynamic RoundKeys and two-level permutation strategy according to generated keys which disrupts pixel correlations within the medical images, providing a high degree of diffusion and confusion. Experimental results demonstrate that the proposed scheme achieves superior encryption performance, with high entropy, low correlation coefficients, and strong resistance to differential and statistical attacks. This makes the method particularly suitable for safeguarding medical images in telemedicine and cloud storage applications, where data security is of utmost importance.

Keywords: confusion, diffusion, encryption, medical image, RoundKey, two-level permutation

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Numerical Analysis of Bank Roughness Impact on Sediment Dynamics in the Medjerda River, Tunisia

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Abstract – To mitigate flooding risks in Boussalem, the Tunisian government conducts regular dredging operations on the Medjerda River. These interventions aim to remove dense vegetation along the riverbanks, which restricts the cross-sectional area, reduces flow velocity, and increases the likelihood of overflow during high flows. However, dredging significantly impacts the physical environment and the river's ecological balance. Vegetation is essential for stabilizing riverbanks, preventing erosion, and reducing sediment transport by bedload and suspension. This study evaluates the effects of roughness variations on sediment transport following these dredging operations. Using the Telemac-Sisyphe model, simulations were conducted along a 17-kilometer stretch of the Medjerda River in Boussalem. The section comprises two zones: the riverbed, which is entirely smooth, and the riverbanks, characterized by variable roughness influenced by vegetation.

Four scenarios were simulated, maintaining a smooth riverbed while incrementally increasing bank roughness, from smooth to rough. The results enabled a detailed longitudinal and transverse analysis of bed evolution. Findings reveal that increasing bank roughness reduces both erosion and deposition, highlighting the critical role of vegetation in bank stability. Vegetation strengthens riverbank cohesion, mitigates erosion risks, and minimizes excessive sediment transport, thereby preserving the integrity of the riverbed. This research provides valuable insights into sedimentation dynamics in the Medjerda River, aiding the prediction of morphological changes and supporting sustainable river management strategies.

Keywords – Telemac-Sisyphe; Sediment transport; Vegetation; Modeling; Medjerda River

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Designing an Eco-Resilient Future: The Intersection of Sustainable Materials and Energy-Efficient Manufacturing

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Abstract – Sustainability in the industry is critical to addressing the growing environmental, social, and economic challenges of today. As non-renewable resources become scarce and environmental issues escalate, sustainable practices in yarn and fabric production are essential for minimizing ecological footprints, reducing resource consumption, and mitigating pollution. The adoption of eco-friendly raw materials in the yarn production (such as organic cotton, biodegradable or recycled fibers), and innovative production techniques (including energy-efficient machinery), can significantly reduce environmental impacts. Furthermore, certifications such as OEKO-TEX® and GOTS ensure that industry standards are met, promoting transparency and accountability. Achieving sustainability requires collaboration across stakeholders, from farmers to consumers, to create a resilient and sustainable textile industry. Through these collective efforts, the industry can reduce waste, protect ecosystems, and contribute to a more sustainable global fashion sector.

Keywords – sustainability, material, production, biodegradable

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Reinventing Production Planning under Constraints with AI and Industry 4.0 Technologies

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Abstract – Industry 4.0, marked by the convergence of technologies such as the Internet of Things (IoT), Cyber-Physical Systems (CPS), Big Data, and Artificial Intelligence (AI), has reshaped the landscape of production management. The Master Production Schedule (MPS), a cornerstone in production planning, must adapt to leverage these advanced technologies. Traditionally, the MPS was designed to generate production schedules based on demand forecasts and resource availability. However, Industry 4.0 introduces new challenges such as real-time data integration, heightened demand variability, and intricate production networks. By embedding AI into the MPS, manufacturers can achieve optimal production planning under constraints, leading to significant improvements in decision-making efficiency and resource allocation.

This review explores the evolution of the MPS in response to Industry 4.0 technologies and focuses on how AI-driven optimization can enhance production planning within complex and constraint-heavy environments. By examining these technological integrations, we aim to outline the future trajectory of production planning optimization.

Keywords – Industry 4.0, Master Production Schedule (MPS), optimization, Artificial Intelligence (AI), Production Planing.

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Constraint-Based Optimization for Assembly Line Balancing: Literature Review

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Abstract **–** Assembly line balancing (ALB) stands as a cornerstone of contemporary manufacturing optimization strategies, embodying the meticulous orchestration of tasks across workstations to minimize idle time, enhance productivity, and optimize resource utilization. This systematic review undertakes a comprehensive examination of the extensive body of research literature dedicated to ALB, spanning a rich diversity of industrial contexts, methodological approaches, and optimization techniques. By meticulously scrutinizing peer-reviewed articles, conference proceedings, and seminal publications, this review synthesizes a nuanced understanding of ALB, encompassing algorithmic frameworks, mathematical formulations, and practical applications pertinent to diverse manufacturing environments. In dissecting the landscape of ALB research, notable themes emerge, including the utilization of computational algorithms, heuristic methodologies, mathematical models, and simulation techniques to tackle the multifaceted challenges inherent in line balancing endeavors. These challenges encompass intrinsic complexities such as task time variability, workforce skill dynamics, and operational constraints, which underscore the need for robust optimization strategies and adaptive decision-making frameworks. Furthermore, this review elucidates areas of scholarly consensus, identifies gaps in current knowledge, and offers strategic insights for advancing both theoretical understanding and practical implementation of ALB principles. By distilling insights from the amalgamated literature.

Keywords – Assembly line balancing, optimization, constraints, production efficiency, heuristic, Metaheuristic, Task Distribution.

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Stabilized Mixed Finite Element Methods for Stokes Problems: A Unified Theoretical Framework

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Abstract – We use the lowest possible order of approximation, piecewise (bi)linear continuous velocities and piecewise constant pressures to compute solutions to generalized Stokes problems. We apply the global jump stabilized method alongside with the three versions of the local jump methods to avoid locking. Our goal is to analyze the stabilized formulations in a unified manner to ensure that stability and convergence properties are preserved.

Keywords – Generalized Stokes problem, finite elements, mixed methods, stabilized method, errors estimate

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A Methodological Approach to Survey Instrument Design for Measuring Barriers to Green building Adoption

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***Abstract* - Introduction:** Green building (GB) adoption in India has been a slow process, making it imperative for researchers to identify the GB adoption barriers in the country. According to industry estimates, even after more than two decades of efforts, green building construction comprises around 5% of the total built-up area constructed anually

Aim: This study aims to design a survey instrument in the form of a questionnaire to capture the opinions and perceptions of GB stakeholders regarding the barriers to the adoption of GBs in India.

Methodology: This study uses standard procedures prescribed in the literature to design a survey instrument incorporating questions related to the respondent's demographic information along with GB adoption barriers items identified from the systematic literature review.

Significance: It explains in detail the methodology used for the design of survey instrument, which can be used by researchers to report the questionnaire design process to enhance reliability and achieve better research outcomes.

Research Outcome: This study puts out a template for future green building researchers to design their survey instruments following the steps mentioned in the research as a base and improvise upon it.

Keywords: survey instrument, design, green building, adoption, barriers.

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Ab initio analysis of the optoelectronic properties of single perovskites CsPbX3 with (X=Br, I)

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Abstract **-** In this comparative study between two simple perovskites, we focus on the study of the optoelectronic characteristics of CsPbX3(X=Br, I) which allows a view in their applications in Led, Solar cell and for Imagery applications too.

Using the FPLAPW method implemented in the wien2k code give us the electronic and optical characteristics of the simples perovskites CsPbI3 and CsPbBr3, this by calculating the states of bands struct and density of state .Comparison between results of characteristics for this two simple perovskites will allow, through their gap, to show the development of the yield of singljonction solar cell. Allowing to observe the valence, conduction bands and to note the gap of CsPbI3, CsPbBr3 essential factor for thin films of solar cell.

Also using a FP-LAPW method implemented in the wien2k code give us optical characteristics of the simple perovskites CsPbI3 and CsPbBr3. the study of optical properties and indices together with the results of electronic properties, in particular gap, permits through absorption, reflectivity and conduction characteristics to determine the different applications of these two materials whether in imagery or the solar cell fields.

Key words: Perovskites, wien2k, Semiconductor, Structband, Optoelectronics, Solar cell, Imagery.

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Instructional Leadership Practices for Effective Formative Assessment

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As an instructional leader, principals' practices are significant for effective school system. The main purpose of this study to explore and compare the principals' and teachers' perceptions about formative assessment practices. The study also finds the answers if there are any difference between principals and teachers opinion about formative assessment practices. Population of the study comprises all principals/heads and teachers of both public and private sector primary schools of district Lahore. Due to time constraints data was collected from 32principals and 50 teachers using a researcher made questionnaires for principals and teachers. . The 17 items questionnaire was based on 5 point Likert type scale. The results showed some variations between the principal's and teachers' perceptions towards the formative assessment to instructional program. The t.test was used. The findings reflect that both teachers and principals have agreement on certain practices of instructional leader's about formative assessment practices about managing instructional programs at schools. The study recommends training and awareness sessions on formative assessment both for teachers and principals.

Keywords: Instructional Leadership, Primary Level, Formative Assessment

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Thermal study of the Collector in a Solar Chimney Power Plant

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Abstract **-** Energy is the basis of all human activity. The use of renewable energies is very old in the history of humanity Pollution problems, the growing demand for electrical energy following the improvement of the way of life and the depletion of fossil fuels are the major factors of orientation towards renewable energies. This study aims to evaluate the performance of the chimney solar power plant; A prototype of the chimney was made at the Mohamed Boudiaf University of M'sila which consists of a collector with a diameter of around 79 cm hollow Plexiglas; the absorber made of steel and the solar tower made of PVC plastic, 1.39 high and 7.5 cm in diameter a mathematical model was extracted to estimate the temperature parameters of this chimney which are obtained from the realization of the experiments on a prototype of solar chimney.

Keywords: Solar chimney, modelling, digital simulation.

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Optimum Design length for Concrete Canal Section for Minimizing Costs of Seepage Losses, Lining and Earthworks

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Earth's life is based on water. It's a rare natural resource. In all its forms, i.e. surface water and ground water, the distribution of water on earth is not consistent. In many regions, groundwater quality varies from fresh to brackish. It may not be appropriate for drinking and irrigation purposes. Surface water has high-quality fresh water and is primarily used for irrigation purposes by diverting water into canals from rivers. As this powerful and terrifying device enters the irrigation system, some water is lost. Due to less water availability and relatively large network disruptions, in the dry spell, and mostly during the winter season, there is a lack of canal water supply. The losses are much higher in the watercourses than in the main channel and distributaries. So, the face of the farmer is a severe shortage of irrigation water issues. Besides this groundwater injection, that is also that which reduces the groundwater level. The conveyance losses in watercourses can be high by applying these lining methods. To overcome this problem, it is necessary to work out the optimum lining length to ensure maximum water savings. It is very important to estimate the losses of water transport in watercourses. In the review, a detailed study was conducted to measure conveyance losses through the inflow and outflow operational approach. The losses in a comparable geographical area from both lined and unlined watercourses were measured and used to calculate the percentage of water savings. In this study, also from field measurements, huge losses during unlined watercourses and less losses in the lined watercourses have been identified. In this research work, the percentage of lining is also numerically checked and validated. The percentage of water saving and percentage increase in lining was modelled using optimum lining length for unlined water courses. The optimum percentage of lining length was estimated as 60 percent, resulting in overall economic benefits and 90 percent water savings.

Keywords. Canal, Optimum length, Cost & economical ways, Food & water security.

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Empowering Regional Languages: A Contextualized Model for Effective LPP in Pakistan

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Abstract - This paper explores a contextualized model for effective Language Policy and Planning (LPP) aimed at empowering regional languages in Pakistan. The linguistic landscape of Pakistan is characterized by its rich diversity, with over 70 languages spoken across its provinces. However, regional languages face significant challenges due to the dominance of Urdu and English in formal domains, educational settings, and socio-economic spheres. The study employs a concurrent mixed-methods research design, incorporating surveys, semi-structured interviews, and document analysis, to gather comprehensive data on language practices, beliefs, and LPP research (Spolsky, 2009). Qualitative data were analyzed using thematic analysis, while quantitative data were processed using SPSS for frequencies and percentages, as well as T-Test and ANOVA for comparative analysis. Triangulation was achieved by comparing findings across the different data sets and multiple stakeholders, including teachers, students, media personnel, and religious figures. Key findings highlight that regional languages are predominantly used in homes but marginalized in formal settings such as official, national, and medium of instruction. Attitudes toward regional languages reveal a cultural attachment but also a perceived practical advantage of Urdu and English for socio-economic mobility. Regional disparities in language use and proficiency suggest the necessity for targeted LPP interventions. The proposed contextualized model for LPP includes five key components: Policy Framework, Educational Integration, Community Engagement, and Resource Development at four levels of planning: status, corpus, medium of instruction, and prestige planning (Baldauf, 2005). The model also emphasizes official recognition and public acceptance through status and prestige planning, as well as legislative support for the promotion of regional languages. Educational integration through MoI planning involves incorporating regional languages into the curriculum and developing multilingual education models. Community engagement includes the active participation of local communities in policy planning. Resource development focuses on allocating financial and technological resources to support regional languages, while monitoring and evaluation ensure the effective implementation and continuous improvement of language policies. By adopting this comprehensive and inclusive model, Pakistan can promote linguistic diversity, enhance educational outcomes, and foster social cohesion, leveraging its linguistic heritage as a resource for cultural enrichment and sustainable development.

Key words: Language Planning and Policy, Prestige Planning, Status Planning, LPP Model, Regional Languages

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The Measurement and Evaluation in Early Childhood: Developmentally Based Formal Assessment Tools

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Abstract – In today's world, the development of a country is often measured by its capacity to produce scientific knowledge. In this context, nations are placing greater emphasis on institutions and organizations dedicated to generating such knowledge. Scientific studies conducted within this framework are gaining prominence. Equally important is the researcher's ability to design, conduct, and report research effectively. In the context of early childhood education, the researcher must not only have methodological expertise but also a thorough understanding of the individual, cultural, and developmental characteristics of the child or children involved in the study (Bulut, 2022). In contemporary early childhood research, it is emphasized that obtaining accurate data requires careful consideration of the complex and distinct reactions of children compared to adults. This process is increasingly recognized as a specialized field of study. From the initial stage of research design to the interpretation and conclusion of findings—with contributions from children—each step must be founded on a robust scientific basis. When gathering information from children, it is essential to avoid making decisions, forming opinions, or providing direction on their behalf. Instead, researchers should engage collaboratively with children, adapting to their pace and needs throughout the process (Şahin & Dosdoğru, 2014; Jones & Stanley, 2008).

Children over 36 months of age tend to establish routines and exhibit a strong attachment to these routines. They are often protective of their personal spaces and can articulate their expectations and demands through verbal or physical expressions (Thomson, 2008). These children also enjoy discussing their wishes and preferences regarding their living environments. Consequently, children as young as 36 months are often willing to participate in scientific research. However, if developmental characteristics are not adequately considered when planning the research process, children may feel pressured and exhibit avoidance behaviors. Şahin and Dosdoğru (2014) note that children who experience negative interactions during research may generalize this negativity to future studies and demonstrate avoidance toward other researchers. A crucial approach in early childhood research is "understanding the child." This perspective is vital for addressing biases and misconceptions surrounding research involving young children. In a study by Holmes (2005), experts expressed skepticism regarding the impact of child participation in the 3–6 age group on research outcomes. Moreover, efforts to enhance child participation were often dismissed as a waste of time and financial resources. These perceptions are frequently rooted in the belief that "reliable data cannot be obtained" from children. To shift this perception, it is imperative to consider children's developmental characteristics and their unique ways of perceiving the world, thereby enhancing the validity and reliability of the research process.

When examined within the scope of measurement and evaluation in early childhood, it is crucial that the tools used are designed with careful consideration of the developmental characteristics of children.

Furthermore, the researcher applying the tool should assess the child's readiness, attention span, and mental state while adhering to the application principles of the measurement tool. This requirement may lead to challenges in implementing formal tools with structured application steps. In the current study, development-based formal tools frequently used in early childhood studies in Turkey were analyzed. The features of these tools, the potential challenges for practitioners, and recommendations addressing ethical concerns are presented based on literature findings. It is anticipated that this study will contribute to the literature on research designs for preschool children, who often have limited expressive language skills and shorter attention spans (Tunçeli & Zembat, 2017).

Formal assessment involves the use of predetermined, structured, and standardized tools and equipment to evaluate a child's development (Wortham & Hardin, 2008). Standard tests are the most commonly used tools in this type of assessment. These tests are measurement instruments that follow specific methods during their design and implementation stages, with established validity and reliability (Ellingsen, 2016). Standardized tests widely used for developmental assessment in early childhood include tools such as the WISC-R, AGTE, and the Frostig Visual Perception Test. These tests were developed based on children's developmental needs. For instance, the Developmental Visual Perception Test, initially developed by Frostig in 1964, originally included five dimensions. However, as knowledge about child development advanced, the test was revised by Hammill, Pearson, and Voress (1993) to encompass eight sub-dimensions. The updated version was renamed the "Developmental Visual Perception Test-II." This revised test comprises eight subtests: Hand-Eye Coordination, Position in Space, Copying, Figure-Ground Relations, Spatial Relations, Visual Completion, Visual-Motor Speed, and Shape Constancy. Since the test is designed to reflect the unique developmental stages of each child, it is administered individually, typically taking between 30 and 60 minutes to complete. Before administering such tests, it is essential for the practitioner to gather demographic information about the child. Additionally, if there are any factors that might influence the measurement results, these should be clearly documented and explained for the benefit of the reader.

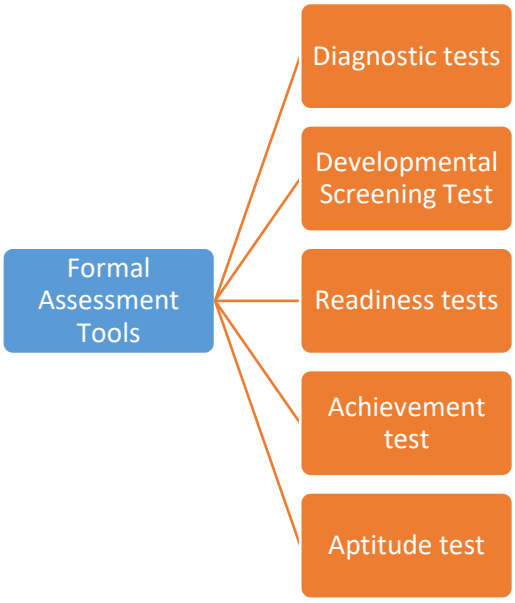


Figure 1Formal measurement tools used in early childhood

Formal assessment tools are classified into five basic groups according to their functions: developmental screening tests, diagnostic tests, readiness tests, achievement tests, and ability tests (Bredekamp, 2015; Gullo, 2005; McAfee & Leong, 2012). Developmental screening tests are designed to assess children's developmental characteristics, learning difficulties, or disabilities and can be applied to all children (Wright,

2010). Commonly used developmental screening tools include the Ankara Development Screening Inventory, Gazi Early Childhood Assessment Tool, Marmara Development Scale, and Denver II Developmental Screening Test. These tools evaluate children's development according to specific norms or criteria (Bredekamp, 2015).

If developmental screening tests indicate that a child differs significantly from peers, diagnostic tests are used as a follow-up. Diagnostic tests provide comprehensive evaluations to identify a child's strengths and weaknesses in developmental and academic domains and to formulate intervention plans (Gullo, 2005). Administering and interpreting diagnostic tests require specialized training, so these tests are typically conducted by trained professionals. Examples of diagnostic tools used in early childhood include the Peabody Picture Vocabulary Test, Gessell Developmental Test, and Bayley Scales of Infant and Toddler Development (Wright, 2010).

Readiness tests, another category of formal assessment tools, are used to evaluate children's readiness for primary school (Maxwell & Clifford, 2004). These tests assess the pre-learning skills children need for school and help determine whether they are ready to transition to the next level. In Turkey, the Metropolitan School Readiness Test and Brainline School Readiness Test are commonly used for this purpose.

Achievement tests are employed to measure and evaluate what children have learned in schools, either generally or in specific areas. These tests consist of items that reflect the knowledge required for particular subjects and are designed based on curricula and textbooks. While their use in early childhood education is limited in Turkey, tools such as the Stanford Early School Achievement Test and the Iowa Basic Skills Test are widely used in other countries.

Lastly, ability tests are developed to predict children's future performance and success levels in specific areas or professions (McAfee & Leong, 2012). Examples include the Early Mathematics Ability Test II and the McCarthy Scales of Children's Abilities. However, the use of ability tests in early childhood is controversial due to their low predictive value (Bredekamp, 2015).

Formal assessment plays a critical role in identifying children's developmental needs and placing them in appropriate educational environments. It determines how children compare to their peers in various developmental areas. Standardized tests are often used as formal assessment tools (Topuz, 2015). These tests involve assessing children under consistent conditions using predetermined tasks and evaluation criteria (Blake & Wise, 2014). Essentially, they compare a child's development to that of peers with similar characteristics (Oduolowu, Zakariyyah & Olowe, 2016).

Types of formal assessment tools used in early childhood are as follows:

- Developmental Screening Tests: These tools are applied to all children to determine developmental levels, identify learning problems, and assess overall development. Examples: Ankara Development Screening Inventory, Gazi Early Childhood Assessment Tool, Marmara Development Scale, and Denver II Developmental Screening Test.
- Readiness Tests: These tests assess children's preparedness for school and guide decisions regarding their transition to the next educational level. Examples: Metropolitan School Readiness Test and Brainline School Readiness Test.
- Diagnostic Tests: Used for children identified during screening as needing further evaluation to create intervention plans. Examples: Gessell Developmental Test, Bayley Scales of Infant and Toddler Development, and Peabody Picture Vocabulary Test.

- Achievement Tests: These tests measure children's learning outcomes in schools, although they are not commonly used in Turkey for early childhood education. Examples: Stanford Early School Achievement Test and Iowa Basic Skills Test.
- Ability Tests: Designed to predict future performance or success in specific areas but are debated due to low predictive accuracy. Examples: Early Mathematics Ability Test II and McCarthy Scales of Children's Abilities. In addition, there are achievement tests and talent tests that are not widely used in preschool education in our country but are frequently used in other countries (Işıkoğlu Erdoğan & Canbeldek , 2017).

While achievement and ability tests are not widely used in Turkey for preschool education, they are frequently employed in other countries (Işıkoğlu Erdoğan & Canbeldek, 2017)

Evaluation in early childhood is conducted to gather information about a child's academic skills, diagnose potential health issues, identify developmental delays, determine whether early childhood education programs need support through special education, and develop tailored programs. This process is critically important for ensuring the quality of inclusive education activities (Tunçeli & Zembat, 2017). Additionally, evaluation plays a vital role in promoting the long-term development of children, identifying developmental delays, and designing early intervention programs (Kahraman, Ceylan, & Korkmaz, 2016). When perspectives on evaluation methods in early childhood are analyzed, it is evident that the use of formal evaluation methods and standardized tests remains a contentious topic. In informal evaluation, all kinds of information about children—such as behaviors, verbal and nonverbal communication, written notes, and drawings—are considered valuable data for assessment. For this reason, some studies suggest that informal evaluation should take precedence over formal methods, especially given the developmental characteristics of young children (Özkan, 2015).

Standardized tests have notable limitations. For instance, children often provide inconsistent answers when taking the same test at different times. Many tests reflect only a small fraction of a child's overall academic performance. Additionally, children's responses such as "I don't know" may actually mean "I don't want to do this" or "I'm bored" (Nicolopoulou, 2004). Diffily (1994), in his research on the beliefs and practices of early childhood educators regarding assessment, found that teachers held negative views of standardized tests. Educators reported that these tests were unsuitable for young children. However, they also acknowledged the need to assess whether there are developmental or learning issues, which they primarily evaluate through personal observations. This finding highlights the importance of formal assessment tools while also pointing to challenges in their application. A similar approach was emphasized by Piaget, a pioneer of the cognitive approach in early childhood education. Piaget argued that if a research topic does not engage a child's interest, the child perceives the activity as a task and quickly disengages (Nicolopoulou, 2004). When children's interest and attention are not taken into account, when the environment for the assessment is poorly chosen, or when the focus is solely on achieving results, significant challenges can arise in the application of measurement tools. To prevent such issues, it is essential to build rapport with the child before conducting an assessment. This includes introducing the measurement tools, explaining the importance of the child's participation and ideas, and providing verbal feedback to encourage engagement. It is equally important to avoid pressuring the child to continue if they lose interest. By taking these steps, the assessment process can be made more effective and child-centered.

Key Words – preschool education , developmentally based formal assessment tools, measurement and evaluation in early childhood, visual perception , increasing child participation in research.

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