The 1st International Symposium on Computational Mathematics
&
Engineering Sciences

3-6 March 2016 Errachidia - MOROCCO

Book of abstracts and presentation of keynote speakers

The 1st International Symposium on Computational Mathematics & Engineering Sciences

3-6 March 2016 Errachidia - MOROCCO

CMES2016

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1st International Symposium on Computational Mathematics and Engineering Sciences (CMES 2016)

Errachidia FST from 3 to 6 March 2016.

This event aims to stimulate interactions between researchers in the field of computational mathematics and their applications in science and engineering, to present the development reached in this areas, and to showcase the computational expertise of our invited speakers and participants.

Topics

Ordinary, Partial and Delay Differential Equations

Chaos and dynamical systems

Numerical methods and scientific programming

Computational fractional calculus

Fluids mechanics, heat and mass transfers

Other areas of Engineering Sciences.

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Proceedings

Extended abstracts will be published in some Special Volumes of six journals.

Procedure, Guidelines and Checklist for the preparation and submission of a paper for the Proceedings of CMES 2016 can be found in the journals websites

The journals in which selected and peer-reviewed full papers of CMES2016 will be published are:

Waves, Wavelets and Fractals Advanced Analysis DeGruyter Open

(Abstracted and indexed). http://www.degruyter.com/view/j/wwfaa

Mathematics in Engineering Science and Aerospace, Cambridge Scientific Publishers.

(Abstracted and Indexed). http://nonlinearstudies.com/index.php/mesa

Nonlinear Studies, Cambridge Scientific Publishers.

(Abstracted and Indexed). http://www.nonlinearstudies.com/index.php/nonlinear

Annual Review of Chaos Theory and Bifurcations and Dynamical Systems.

(Abstracted & indexed), http://www.arctbds.com

Applied Mathematics & Information Sciences, Natural Science Publishing.

(Abstracted & indexed), http://dx.doi.org/10.12785/amis

Revue Africaine de la Recherche en Informatique et Mathématiques Appliquées.

(Abstracted & indexed), http://arima.inria.fr

Plenary Sessions

Aesthetic and Mathematics

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Abstract. In this study, we have investigated the relationship between aesthetic, art and mathematics. We have showed that beauty and harmony can be stated by mathematical formulas. We have explained that, the sense of beauty of nature can be defined as mathematical definition such as golden ratio, symmetry and harmony. We have expressed some examples about golden ratio in nature.

Keywords: Beauty, aesthetic, art, Mathematics, golden ratio.

Active and passive controls of nanoparticles in Cheng-Minkowycz Natural Convection Fluid Problem

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Abstract: The natural convection flow of nanofluid in Cheng-Minkowycz problem along a vertical plate is considered. The governing equations are converted into non-dimensional forms using similarity transformation variables. The resulting system of nonlinear differential equations is solved numerically. Both active and passive controls of nanoparticles in the fluid flow are examined. The influences of different parameters are demonstrated through profiles of velocity, temperature and nanoparticle volume fraction.

Step forward in fractional calculus: Theory, Methods and Applications

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Abstract: Newly established definitions of derivatives with fractional order with so singular and nonlocal kernel are presented. The theory underpining these new derivatives is presented together with their physical interpretations. Some analytical and numerical methods to handle differential equations with the new derivatives are also presented. Some applications to reals world problems for instance groundwater flowing within a confined aquifer will be presented.

Keywords: New trend in fractional calculus; integral transform; physical interpretations, applications.

Entanglement Engineering of Many Atoms with Nanoresonators

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Abstract: In this communication, we discuss different aspects of information entropy and its application as an indicator of the quantum entanglement. We focus on the dynamics of multi-atom systems coupled to a nanomechanical resonator under influence of both a phonon bath in contact with the resonator and irreversible decay of the qubits. Even in the presence of enviroment, the inherent entanglement is found to be rather robust. Due to this fact, together with control of system parameters, the system may therefore be especially suited for quantum computer. Our findings also shed light on the evolution of open quantum many-body systems.

Why new fractional derivatives?

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Abstract : In this talk I will explain why we have to consider some new fractional derivatives in order to describe better the dynamics of complex systems. Some illustrative examples will be provided.

***Keywords*:** Fractional calculus,Caputo derivative, Caputo-Fabrizio derivatives, complex systems

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Sumudu Applications to Algebraic and Transcendental Equations.

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Abstract: We present ideas of how to use the Sumudu transform and its powers to solve Algebraic and Transcendental Equations.

Applications des Microondes en Industrie: Cas de la Technologie CMOS Millimétrique et à base (AlGaN/GaN)

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Résumé : Depuis plusieurs décennies, l'utilisation des microondes est devenue indispensable dans des applications industrielles (civils et militaires), médicales et en télécommunications (Radar anticollision, Téléguidage et localisation GPS. Ainsi, la conception des composants microondes fonctionnant dans des conditions opérationnelles variables est nécessaire de choisir la technologie du composant la plus adaptée aux applications visées. La technologie CMOS en gamme des fréquences millimétriques et à grand gap (AlGaN/GaN) s'est progressivement imposée ces dernières années dans différents secteurs d'activités industriels. L'avantage de cette technologie est son fonctionnement à très hautes fréquences et son niveau de puissance élevé et fonctionnant à de très grande température.

A ce jour, de nombreuses questions restent ouvertes sur des comportements particuliers des composants hyperfréquences ; en particulier les transistors. Ces questions doivent être maitrisées pour sécuriser leurs applications dans des équipements industriels :

Effet de la technologie CMOS et GaN sur les performances macroscopiques Impact CEM sur les transistors hyperfréquence La fiabilité des transistors de puissance en industrie

Le premier **Symposium International on Computational Mathematics and Engineering Sciences (CMES 2016)** sera l'occasion de faire le point sur la manière d'appréhender les différentes applications des microondes. La conférence présentée mettra en exergue la conception des composants hyperfréquences pour aboutir à des nouvelles technologies appropriées avec les défis majeurs

de la concurrence en industrie.

Mots clés : Applications Microondes, Technologie CMOS et AlGaN/GaN**,** Composants hyperfréquences

Analytical And Numerical Methods For Solving Nonlinear Partial Differential Equations-I

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Abstract

From all over the world, many scientist have extensively studied on the mathematical modelling of real world problems. While these real world problem may be seriously important for living creatures, especially humankind, other may be insignificant for living creatures. We can observe them in many field of life. Futhermore, Many mathematical models such as the Modified Exponential Function Method, Adomian Decomposition Method, Modified Kudryashov Method have been presented.

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A perspective on computational techniques for solving singularly perturbed delay differential equations

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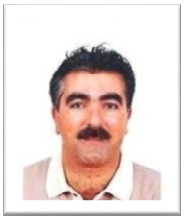
Abstract: This survey study contains a large amount of material and serve as an introduction to some of ideas and numerical methods of singularly perturbed delay differential equations. In continuation of a survey performed earlier this paper limits its coverage to some standard singular perturbation models and numerical methods developed by numerous researchers after 2000. A summary of the results of some recent methods is presented and this leads to conclusions and recommendations regarding methods to use on singularly perturbed delay differential equations. In this study, we considered one-dimensional singularly perturbed delay differential equations only.

Harmonic approximation in Hardy spaces. Application to some inverse problems



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Abstract: We consider the Cauchy problem of recovering both Neumann and Dirichlet data on the inner part of the boundary of an annular domain, from measurements on some part of the outer boundary. The ultimate goal is to compute the Robin coefficient, which is the quotient of these extended data, on the inner boundary. Using tools from complex analysis and Hardy class approximations, we present constructive and robust identification schemes val-idated by a thorough numerical study. Also, We are concerned with an inverse problem related to sources detection from boundary data in a 2D medium with piecewise constant conductivity. It stands as a 2D version of the inverse problem of electroencephalography, where pointwise sources model epilepsy foci, with the so-called multi-layer spherical model of the head (scalp, skull, brain). When overdetermined electrical measurements (potential and current flux) are available on the scalp, one wants to recover the current sources (conductivity defaults) located in the brain (inner boundary). This recovery issue reduces to a number of inverse problems, where the sources identification process makes use of best rational approximation in the disk, whereas the preliminary cortical mapping step (Cauchy type issue) relies on best constrained harmonic or analytic approximation in an annulus (bounded extremal problems).

Analytical And Numerical Methods For Solving Nonlinear Partial Differential Equations-II

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Abstract

In recent years, many novel mathematical models have been submitted to the lterature. Futhermore, solving these models is important in term of explaining new significant properties of mathematical models. Hence, the more new analytical solutions are obtained, the better we understand the physical mean of these models. Therefore, some of these techniques have been mentioned in this talk.

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Numerical Solution of Fractional Bagley-Torvik Equation in the Reproducing Kernel Space

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In this study, we proposed reproducing kernel method (RKM) for solving boundary value problem of Bagley-Torvik differential equation. The central point of this approach is to set up a reproducing kernel Hilbert space (RKHS) that satisfies the boundary conditions. Based on the properties of the RKHS, this approach is applied to obtain precise numerical approximation. The results shows that our approach is very effective and simple.

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Analysis of Heat Transfer Enhancement in Water via Carbon Nanotubes

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Present study deals the heat transfer analysis of water based single and multiple wall carbon nanotubes. Constraints of the model are defined in such a ways that nanofluid is flowing over a stretching cylinder while the magneto-hydrodynamics (MHD) effects are normal to the surface of cylinder. The mathematical model is based upon the momentum and the energy equations while the boundary conditions are adjusted as per shape of the geometry. Performance of prescribed heat flux is also introduced at the surface of the stretching cylinder. Thermo-physical properties of both water and carbon nanotubes are considered. The carbon nanotubes and curvature parameter exhibit the dominant effects on the velocity, temperature, skin friction and local Nusselt number which are presented in graphs and tables.

Special sessions

Codes correcteurs à plusieurs variables.

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Résumé : La théorie du codage est l'étude des méthodes permettant le transfert d'informations de façon efficace et précise. Cette théorie est connue une évolution remarquable grâce à l'interaction entre la théorie d'information et l'algèbre.

Dans la théorie du codage on cherche à étendre certains notions ´élabores dans le cas commutatif et essayer d'adapter des résultats prouves dans le cadre commutatif au cas non.

Dans ce cadre Lionel Caussade a étudié des codes sur des anneaux non commutatifs dans son article, Codes correcteurs sur des anneaux d' ordre multivariées, ce qui a permet d'adapter certains algorithmes au cas non commutatif et de prouver quelques résultats déjà prouvé dans le cas commutatif

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Caractérisation d'une antenne microruban rectangulaire double patch par le modèle de ligne de transmission

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Résumé: Les antennes microruban ont un certain nombre de propriétés importante dans le

domaine de télécommunication, cependant ces antennes présente une bande passante étroite ce qui limite leurs performances. Les efforts pour améliorer la largeur de bande aboutissent généralement à une réduction de l'efficacité de rayonnement ainsi que le gain de l'antenne. En outre, le diagramme de rayonnement des antennes microruban est normalement hémisphérique au lieu d'être omnidirectionnelle.

Dans ce travail on présente une antenne microcruban avec deux éléments rayonnants, c'est-à-dire on remplace le plan de masse par un élément rayonnant. Ces deux éléments sont alimentés à travers deux d'ouverture au niveau du substrat diélectrique, en utilisant une ligne d'alimentation unique placé entre un talon adapté en série.

Les résultats obtenus donne une nette amélioration de la largeur de bande d'environ 14% pour un taux d'onde stationnaire ROS= 2.1, sans pour autant diminuer l'efficacité de rayonnement avec une quasi omni directionnel du diagramme de rayonnement.

Mots clés : Antenne microruban, bande passante, modèle de ligne de transmission, diagramme de rayonnement.

Riesz basis approach to the control of a hybrid system of elasticity

AOURAGH DRISS

FSTE

Abstract : A linear feedback control designed for the system for the stabilization of a flexible beam with a tip body. The Riesz basis approach is adopted in the invetsigation. It is shown that the closed-loop system is a Riesz spectral system and as consequence, the exponential stability is concluded. Finally, some numerical results are also presented.

Existence of Solutions for $p(x)$-Laplacian Steklov problem without Ambrosetti-Rabinowitz type condition.

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This paper is devoted to study the existence and multiplicity of solutions for superlinear $p(x)$-Laplacian equations with nonlinear boundary conditions. By using a variant Fountain theorem without Palais-Smale type assumptions and under no Ambrosetti-Rabinowitz's superquadraticity conditions, we obtain the existence and multiplicity of solutions.

Improvement of the numerical integration's quality in Meshless methods.

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Several methods are suggested to improve the numerical integration Galerkin weak form for Meshless methods. In fact, integrating without taking into account the characteristics of shape functions (rational functions , with compact support..) , causes a large integration error that influences the PDE's approximate solution . Comparisons between different methods of numerical integration for rational functions are discussed. Numerical results were presented to prove the theoretical part and to show the efficiency of algorithms.

Existence Results to nonlinear unilateral problems for diffusion-convection equations defined in Orlicz-Sobolev spaces with L^1-data.

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Abstract: We prove the existence results in the setting of Orlicz space for the unilateral problems associated to the following equation, $$Au = -\mathop{\rm div} (a(x, u, \nabla u)) = f - \mathop{\rm div}\Phi(x,u),$$ where A is a Leray-Lions operator having a growth not necessarily of polynomial type. The lower order term Φ satisfies a growth condition. The right hand side f belongs to $L^1(\Omega)$.

A new Bernoulli wavelet operational matrix application to optimal control problems

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Abstract: In this research paper we present a new hybrid analytico-numerical scheme for solving linear quadratic optimal control problems. The method is based on a new Bernoulli wavelet matrix. After presenting relevant properties of the Bernoulli wavelet, we apply its connected operational matrix to derivatives. The solution is then obtained by reducing the optimal control problem under consideration to that of algebraic equations, using Lagrange multipliers. The new scheme simultaneous straightforward applicability and thourough validity balance is then demonstrated through illustrative examples.

Sumudu transform of Weierstrass function.

Rathinavel Silambarasan.

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Abstract: Weierstrass function, Weierstrass-Mandelbrot function and its variants of fractal functions are Sumudu transformed to show that non regular curves can be smoothened. Obtained results are verified through Maple graphs to show the simulation between non regular, fractal curves to regular, smooth curves for different partial sums.

Sumudu computation of the transient magnetic field in a lossy medium.

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Abstract: This research article aims at treating the transverse electromagnetic wave propagation in lossy medium problem, labeled TEMP. Indeed, following the trail of works by Hussain and Belgacem, and Belgacem et al. towards getting the transient electric field solution, in this paper we alternatively Sumudu treat Maxwell's equations, only to exhibit the transient magnetic
field this time around. Moreover, we establish new analytico-numerical results, and exhibit Maple graphical profiles through Sumudu application to ramp, gaussian, pulse, and finite sinusoidal functions. Furthermore, we feature connected useful shifting properties of the Sumudu transform.

Résultat de positivité pour une équation biharmonique sous les conditions au bord de Dirichlet

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Abstract: Dans ce travail, on montre un résultat de dichotomie donnant une propriété de préservation de la positivité pour une équation biharmonique sous les conditions au bord de

Dirichlet. Cette équation apparaît dans les MEMS (Micro-Electro-Mechanical Systems) et les NEMS (Nano-Electro-Mechanical Systems).

An energy-gap cost functional for cavities identification

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Abstract: This work focuses on an ill-posed problem governed by Laplace equation. We are concerned with the recovery of cavities from the knowledge of Cauchy data. This inverse problem is formulated to a shape optimization one by minimizing an energy-gap cost functional. A steepest descent algorithm using the gradient information combined with the level set method solves the obtained problem. In order to confirm our theoretical results, some numerical simulations are illustrated.

Voids identification from partially overdetermined boundary data

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Abstract: A new framework for a geometric inverse problem in linear elasticity is investigated in this work. Our aim is to recover cavities from the knowledge of partially overdetermined boundary data. The approach proposed is based on the topological asymptotic analysis. An asymptotic expansion for an energy misfit functional is obtained with respect to the creation of a small hole in the domain. The efficiency of our approach is illustrated by some numerical results carried out by a one shot reconstruction algorithm.

A corner detector based on equilibrium of electrostatic forces and entropy for color images

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Abstract: This paper deals with the corner detection problem in color images. It presents a new approach, based on the equilibrium of electrostatic forces in conjunction with entropy, where the pixels intensities are modeled as punctual electric charges. These charges are uniformly distributed on a plane surface. Hence, two designed operators providing the approximate gradients are first determined. Then, the relative entropy to this component weights the obtained gradients for each image component. Finally, corners can be detected by using the weighted gradients in the modified Harris-Stephens framework detector.

This approach is simple, and easy in implementation. It is tested on synthesized and real images that show good results.

Keywords: Color images; Corner detection; Entropy; Electrostatic forces; Image processing.

Mathematical modeling of reinforced heterogeneous porous viscoelastic materials

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The issue of modeling the time evolution behavior of viscoelastic materials has attracted the attention of many researchers. Actually, modeling the behavior of this kind of passive materials accounting to time evolution fields and properties. Is challenging tops in this work, porous viscoelastic materials are considered. Where the porous effect is introduced by voided inclusions embedded in a viscoelastic matrix. The effective behavior is modeled by a delayed integro-partial differential system [1] et and For a methodological approach the resolution of the resulting equations based on the dynamic Green's functions is elaborated. The main field approach is used and the localization tensors relating the local fields to the global fields are

obtained. The effective properties are given through tonsorial convolution products. The direct and inverse tonsorial convolution products are thus for numerical predictions. A methodological approach is elaborated in time and frequency domains for various types of reinforced porous algorithm are developed for this purpose.

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Equilibrium of electrostatic forces-based edge detection method

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Abstract: In this paper, a new and simple edge detection method based on the equilibrium of electrostatic forces is presented. The method assumes that a gray-level image can be regarded as a charged plane surface of an electric conductor. Each image pixel is then considered as a punctual electric charge represented by its gray value intensity. Electric charges can have positive or negative signs and undergo push or pull forces by all other neighboring. Hence, edge information can be measured by these forces, which can be determined according to Coulomb's law of electrostatics.

The method is tested on the Berkeley Segmentation Dataset and compared with some other methods with satisfactory results.

Keywords: Coulomb's law of electrostatics; Edge detection; Electrostatic forces; Image processing.

LBM Simulations of Unsteady Natural Convection Generated by a Sinusoidally Heating Square Block Confined in a Square Cavity Filled with a Nanofluid

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Abstract: Buoyancy driven flow and heat transfer between a horizontal cylinder (square cylinder or circular cylinder) and its surrounding medium (confining square or cylindrical configurations) is a problem of great importance in a wide variety of engineering applications. This geometry belongs to the category of natural convection problem within complicated geometries. To tackle such problems, efficient numerical methods are required. The present study is conducted in this spirit. It consists of unsteady natural convection developed around a square heating block placed at the center of a square cavity. The unsteadiness of convection is imposed by the temperature of the block which is supposed to vary with a sinusoidal manner in time. The cavity confining the block is cooled and insulated respectively from its horizontal and vertical boundaries. The aspect ratio Ar of the heating block (ratio of width's block to that of the confining cavity) is maintained constant (Ar = 0.4). The space between the block and the cavity is filled with the nanofluid Al2O3-water. Since the parameter Ar has a determinent effect on the critical Rayleigh characterizing the Hopf's transition in the case of a block heated with a constant temperature, the Rayleigh number value was fixed at Ra = 100000 to remain below this threshold. By this way, we avoid the combination between the two kinds of unsteadiness; the free one (obtained for Ra > RaC) and the one imposed by the variable heating temperature. Thus, the main controlling parameters are the amplitude and period of the block's temperature and the volume fraction of Al2O3 nanoparticles. These parameters have been varied in wide ranges. The physical properties of the nanofluids (viscosity and thermal conductivity) are determined using the relatively recent correlation proposed by Corcione and established on the basis of numerous data borrowed from literature. The studied problem is governed by the Boltzmann equations and the latter (velocity and temperature equations) are written in the Bhatnagar–Gross–Krook (BGK) approximation. In the LBM, the real domain was decomposed into uniform lattices of Arrangements D2Q9. The obtained results show that the volume fraction of nanofluids and the heating mode modify the resonance frequency, the flow structure and heat transfer characteristics. In addition, this study proves the ability of LBM to tackle complex heat transfer problems.

Modeling and optimization of the strategies service of the by Monte Carlo simulation

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Abstract : The opening and development of the tourism market requires ONDA Errachidia to be more competitive and responsive in the maintenance field. It becomes very important to better manage the production tool whose performance is closely related to the "maintenance process".

Indeed, the optimal management of an industrial system throughout its life cycle, from design to decommissioning involves the search for a compromise between conflicting objectives. It drew a distinction on the one side between economic performance, costs and benefits, and on the other side, aspects of reliability, availability, safety of people and plant safety. To bring elements of aid in the decision to face this problem, it is necessary to have tools and methods for analyzing systems and evaluate qualitatively and quantitatively their performance in terms of operational safety at large, that is to say, reliability and maintenance, while respecting the economic constraints.

The aim of this work is to offer maintenance managers, methods and mathematical models to anticipate and control the costs of maintenance and operation.

Indeed, this work consists in developing a modeling approach by the Monte Carlo simulation method of the operating multi-component system maintained by a maintenance strategy as well as an evaluation process of its performance.

Key-words : Maintenance,Reliability, Cost, Modeling, Optimization, Monte Carlo

Détermination de la viscosité de milieux micellaires par RPE

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Abstract : La RPE fait partie des méthodes expérimentales de physique comme la diffusion de la lumière ou la diffusion des neutrons aux petits angles utilisées pour étudier les milieux micellaires.

L'exploitation des résultats obtenus par RPE nous a permis de calculer la viscosité τ du milieu dans lequel est adsorbé le marqueur de spin utilisé, en l'occurrence le 16-doxylstearic acid methyl ester (16DSE)

Les deux tensioactifs utilisés sont le bromure dodecyltrimthylammonium (DTAB) et le chlorure dodecyltrimthylammonium (CTAB).

Pour calculer la viscosité de nos milieux micellaires, nous avons utilisé l'équation de Debye-Stokes : $\tau_{relative} = 4\pi\eta R_H^3 / 3KT$

τ étant la viscosité du solvant alors que R_H représente le rayon hydrodynamique de la molécule du marqueur de spin dans cette communication nous présenterons l'ensemble des résultats obtenus.

A view to some elliptic curves transformations

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Abstract: We present a change of variable that reduce to the Weierstrass elliptic curve equation form for characteristic different from 2 and 3, and prove the related group laws.

Adomian Decomposition Method For Time Fractional Schrodinger Equation

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Abstract: The Adomian decomposition method is used to solve the time fractional Schrodinger equation. The time fractional derivative is described in the Caputo sense and the solution of the time fractional Schrodinger equation with time-independent potential is expressed in the explicit form with the time dependent Mittag-Leffler function.

Optimal Kinematic Design of 3RRR Parallel Robot

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***Abstract*:** Parallel robots display important advantages over their serial mechanisms in several applications where both accuracy and dynamic response are needed .Indeed; Parallel robot is fundamentally a closed-loop kinematic chain mechanism in which the end-effector is connected to the base by several independent kinematic chains. Due to the potential advantages of parallel robots such as high rigidity, high accuracy and great carrying payload capability, they have fascinated significant attention and interest amongst the researchers in the past decade.

Thus, because of the strong dependence of geometric performances and their parameters, the design problems for the parallel robots are more complex and the efficacy of the design method become more difficult. In this paper, we present first, the inverse kinematic problem and Jacobian matrix of the 3RRR parallel manipulator which is necessary for subsequent analysis, then, an optimal design study is achieved for a class of parallel robots in order to find a set of parameters that attain a good performance in terms of the important performances indexes: the workspace capabilities and dexterity. Finally, simulations results are obtained.

Keywords — Inverse kinematic, Jacobian Matrix, Parallel Robot, Optimal design.

Stochastic Stability of an epidemic model

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Abstract: This work, is devoted to the study of stabilities of an epidemiological model, which a random perturbation. We shall give sufficient condition for their stability of of the disease-free equilibrium. Numerical simulation of the stochastic model shows that the introduction of noise modifies the threshold of system.

Analysis of Unit-Cell environement bahaviour of reflectarray antenna

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Abstract: The most important part of the reflectarray analysis and design is the accurate characterization of the individual reflectarray element for reflection phase performance [1]. This paper presents an analysis and design of the unit-cell environement, such as range of the phase , bandwidth and the reflection loss [2].

The infinite array model is an effective approach for characterization and analysis of reflectarray with a large number of elements, Floquet's theorem (modes) is used, the overall analysis is reduced to the unit-cell environment [3], this infinite-array model takes into account mutual coupling between elements, and is an efficient way to accurately characterize reflectarray elements.

Keywords: Reflectarray, reflection phase, Floquet mode.

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CSCE Method for Obtaining New Interactions Among Some Waves

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Abstract: In literature, there are many mathematical methods in mathematical physics such as extended trial equation method [1], new function method [2,3] and so on. Recently, new approaches, called as the consistent Riccati equation (CRE) and consistent tanh expansion (CTE) methods, have been developed to find new interactions among waves [4-7]. In this paper, a novel approach that assumes $R_{\omega}=\sin\left(R\left(\omega\right)\right)$ is presented in order to construct the new interactions between cnoidal waves and solitons of compound KdV-Burgers equation. Also it is shown that the consistent sine-cosine expansion (CSCE) method is very efficient mathematical tool for solving nonlinear partial differential equations.

Keywords: CSCE method, traveling wave solutions, interactions among waves.

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An Application of CRE Method to Find New Interactions Among Waves

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Abstract: Nonlinear evolution equations, defined nonlinear physical phenomena in real world problems, are physically important. Many mathematical methods have been constructed to explain physical phenomena of these problems [1,2]. However, it is not easy to obtain new interactions among wave solutions. In [3], the authors proposed a new method called as the consistent Riccati equation (CRE) method. New interactions between solitons and cnoidal waves for some wave equations are obtained by using CRE method [3-5]. Then, this method is modified by several other authors [6,7]. In this study, we apply CRE method to solve a nonlinear physical problem and find new interactions among traveling wave solutions. Also, the advantages of this approach are listed by this study.

Keywords: CRE method, wave solutions, interactions among waves.

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CSCE Method for Obtaining New Interactions Among Some Waves

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Abstract: In literature, there are many mathematical methods in mathematical physics such as extended trial equation method [1], new function method [2,3] and so on. Recently, new approaches, called as the consistent Riccati equation (CRE) and consistent tanh expansion (CTE) methods, have been developed to find new interactions among waves [4-7]. In this paper, a novel approach that assumes $R_{\omega} = \sin\left(R\left(\omega\right)\right)$ is presented in order to construct the new interactions between cnoidal waves and solitons of compound KdV-Burgers equation. Also it is shown that the consistent sine-cosine expansion (CSCE) method is very efficient mathematical tool for solving nonlinear partial differential equations.

Keywords:CSCEmethod,travelingwavesolutions,interactionsamongwaves.

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Prototype Traveling Wave Solutions of New Coupled Konno-Oono Equation

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Abstract

In this study, we have applied the modified $\exp\left(-\Omega\left(\xi\right)\right)$-expansion function method to the new coupled Koono-Oono equation. We have obtained some new analytical solutions such as complex function, hyperbolic function and rational function solutions. We have observed that all analytical solutions have been verified the new coupled Konno-Oono equation by using Wolfram Mathematica 9. Then, we have constructed the two and three dimensional surfaces for all analytical solutions obtained in this paper by the same computer program.

Keywords: The modified $\exp\left(-\Omega\left(\xi\right)\right)$-expansion function method, the new coupled Konno-Oono Equation, Complex hyperbolic function solution.

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New complex hyperbolic function solutions for the (2+1)-dimensional dispersive long water–wave system

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Abstract

In this paper, a new algorithm called the "Modified $\exp(-\Omega)$-expansion function method" has been proposed. This algorithm is based on the $\exp(-\Omega(\xi))$-expansion method. The proposed analytical method has been expressed comprehensively in this study. The analytical solutions and application results are presented by drawing the two and three dimensional surfaces of analytical solutions such as hyperbolic, complex, trigonometric and rational function solutions for the (2+1)-dimensional dispersive long water–wave system. Finally, a conclusion has been presented by mentioning the important discoveries in this manuscript.

Keywords: The modified $\exp(-\Omega(\xi))$-expansion function method, the (2+1)-dimensional dispersive long water–wave system, Hyperbolic function solution, Trigonometric function solution, Complex function solution.

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Analytical Solutions for Local Fractional Telegraph Equations

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Abstract: The main objective of this work is to obtain analytical solutions of local fractional telegraph equations by using local fractional homotopy perturbation sumudu transform method. The proposed technique finds the solution without any discretization or restrictive assumptions and avoids the round-off errors. The results obtained by the scheme show that the method is easy to implement and computationally very attractive.

Key words and Phrases: Telegraph equation; Local fractional derivative; Homotopy perturbation method; Sumudu transform method.

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New Exact Solutions of the Coupled sine-Gordon Equations

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Abstract

This study focus attention on new exact solutions of the coupled sine-Gordon equations. The extended trial equation method (ETEM) which is one of the analytical methods has been handled for finding exact solutions of the coupled sine-Gordon equations. By using this method, some exact solutions of the coupled sine-Gordon equations have been obtained. Also, by using Mathematica 9, some graphical simulations were done to see the behavior of these solutions.

Keywords: The coupled sine-Gordon equations, extended trial equation method, exact solutions,

Mathematica 9.

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Numerical Solution of Fractional Bagley-Torvik Equation in the Reproducing Kernel Space

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In this study, we proposed reproducing kernel method (RKM) for solving boundary value problem of Bagley-Torvik differential equation. The central point of this approach is to set up a reproducing kernel Hilbert space (RKHS) that satisfies the boundary conditions. Based on the properties of the RKHS, this approach is applied to obtain precise numerical approximation. The results shows that

our approach is very effective and simple.

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New Exponential and Hyperbolic Function Solutions to The Space-Time Fractional Boussinesq Equation

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Abstract

The main aim of this paper is to find the new travelling wave solutions such as exponential and complex analytical function solutions to the space–time fractional Boussinesq equation by using Bernoulli sub-equation function method. Two and three dimensional surfaces of analytical solutions obtained in this paper have been plotted with the help Wolfram Mathematica 9. A comprehensive conclusion has been presented to the literature at the end of paper.

Keywords: Bernoulli sub-equation function method; the space–time fractional Boussinesq equation; Complex function solution; Exponential function solution,

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The Sine-Gordon expansion method to the Davey–Stewartson equation with power-law nonlinearity

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Abstract

The main aim of this paper is to find new analytical solutions to the Davey–Stewartson equation with power-law nonlinearity by using the Sine-Gordon expansion method. This algorithm yields many analytical solutions such as hyperbolic and complex solutions to the problem considered in this paper. Wolfram Mathematica 9 has been used throughout the paper for mathematical calculations along with obtaining two and three dimensional surfaces of solutions.

Keywords: The Sine-Gordon expansion method; the Davey–Stewartson equation with power-law nonlinearity; Complex hyperbolic function solution.

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Analyzing the repairable aging cold standby system via geometric process

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Abstract

In many engineering systems, cold standby redundancy is an effective way to achieve high system reliability while preserving limited power resources. Cold standby redundancy technique use one or more redundant components that are unpowered, do not consume any energy and do not fail until being activated to replace a faulty online component. Whenever working component fails, then an available cold standby component is immediately powered up to take over the mission task.

Shahbazov and Sağlam [4] considered a redundant system of two dissimilar units and investigated the maximization of the mean lifetime of the system with exponential repair times under the restriction that total service rate is fixed. Some recent works on the research of the cold standby systems are in Levitin et al. [3], Xing et al [5], Halisdemir and Çalık [1].

In imperfect repair model, it is more acceptable to consider that the successive operating times of the component after repair will be even shorter while the consecutive repair times of the component after fail will be even longer. For such a stochastic phenomenon, Lam [2] studied a new repair- replacement policy and introduced a geometric process model. In this model, after the repair the successive operating times of the system are stochastically decreasing while the consecutive repair times after the failure are stochastically increasing.

In this paper, we study a cold standby repairable system consisting of two non-identical components and a single repair facility with one repairman. It is assumed that, one of the two components is operating while the other is in cold standby and also two components follow a geometric process. Under these assumptions, at first we present Laplace-Stieltjes transform of the system lifetime and then we give some useful inequalities about the mean lifetime of the system.

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Parameter uniform methods for singularly perturbed delay differential equations

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Abstract : This study deals with singularly perturbed initial value problem for linear second-order delay differential equation. Difference schemes are constructed for this problem. The difference schemes are shown to be uniformly convergent to the continuous solution with respect to the perturbation parameter. Numerical examples are solved using the presented methods and compared the computed result with exact solution of the problem.

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Exponential stabilization of a variant of the Scole model without dissipativity

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Abstract: This work deals with the boundary feedback stabiliza-tion of a variant of the SCOLE model, namely, a flexible structure modeled by an Euler-Bernoulli beam which is held by a rigid hub at one end and totaly free at the other end.

A linear feedback control is designed regardless of dissipativity of the system for the stabilization of a flexible beam with a tip rigid body. The Riesz basis approach is adopted in the investigation. It is shown that the closed loop system is a Riesz spectral system and as consequences, the exponential stabiliyt is concluded. Finally, some numerical results are also presented.

Dynamics of Solutions and Approximation for Partial Functional Differential Equations with Delay

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Abstract: This work aims to investigate the existence and uniqueness of almost periodic solution for partial functional differential equations with delay. Here we assume that the undelayed part is not necessarily densely dened and satises the well known Hille-Yosida condition, the delayed parts are assumed to be almost periodic with respect to the second argument and Lipschitz continuous with respect to the second argument. Using the exponential dichotomy and the contraction mapping principle, some sufficient conditions are obtained for

the existence and uniqueness of almost periodic solution.

Lyapunov-Sylvester Computational Method for Two-Dimensional NLS Equation

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Abstract: The present work is devoted to the development of a numerical method based on two-dimensional finite difference scheme to approximate the solution some nonlinear equations. An order reduction method is adapted leading to a system of coupled PDEs which is transformed by the next to a discrete algebraic one.

We recall in brief that such a method leads to fast convergent and more accurate discrete algebraic systems without going back to the use of tridiagonal and/or fringe-tridiagonal matrices already used when dealing with multidimensional problems especially in discrete PDEs

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Natural Convection Cooling of a Partially Open and Heated Cavity

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Abstract : The present study deals with numerical simulations of natural convection heat transfer and fluid flow in an open square cavity partially heated with three discrete sources uniformly distributed on its left vertical wall facing the one where an aperture is located at three positions. The governing equations were solved based on a mesoscopic approach using the Multiple–Relaxation–Time Lattice-Boltzmann method (MRT-LBM). The governing parameters are the Rayleigh number ($10^3 \leq Ra \leq 10^6$), the aperture position ($AP = d/H = 0.25, 0.5, 0.75$) and the Prandtl number corresponding to air as a working fluid ($Pr = 0.72$). The main attention of the study is focused on the conjugate effects of the parameters Ra and

AP on the volume flow rate and the thermal interaction between the fluid and the heating sources for an aperture size $AS = h/H = 0.5$ (see Fig. 1). Results obtained show that, depending on the application, the position of the aperture can play an important role in the control of heat transfer process and the aspirated volume flow rate.

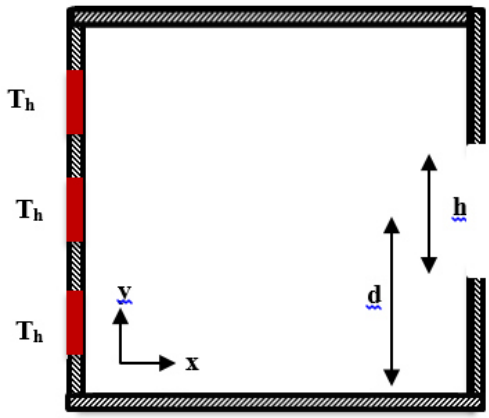

Fig. 1. Schematic of the open cavity system and boundary conditions.

Numerical approximation by FEM of an boundary detection problem

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Abstract: In the boundary detection problem, which is also known as the geometry identification problem, the materials used as electrical conductors, electromagnetic elements are subject to wear by corrosion or by direct contact with other elements causing a material loss or cracks. A very important issue in the nondestructive testing of materials is the ability to detect possible defects (cracks, fractures for example) inside the material. In practice, it often happens that such surfaces are not accessible to direct inspection, hence in order to detect the possible presence of corrosion one has to rely on measurements only performed on the accessible part of the specimen surface. Our problem is to estimate this loss, or place of crack which is to determine the unknown part of the boundary that has suffered corrosion by making measurements of voltage and current on the known parts of the boundary.

In this work, we present physical motivations of the problem. We formulate the problem as a shape optimization problem by introducing the Neumann condition of the accessible part in a cost functional to be minimized, which complicates the study of continuity state that requires more regularity of the free boundary. We showed as the first the work that this problem has a unique solution «C. Tajani, J. Abouchabaka, N. Samouh, on the existence of solution for an inverse problem, TWMS J. App. Eng. Math. V.3, N.1, pp. 33-45» . Here, we propose an algorithm based on the use of adjoint state to solve it. we are interested in the numerical approximation of the free boundary by using the finite element method. To show the efficiency of our approach, we give some numerical results.

Existence of solution for unilateral contact problem with Tresca friction in Thermo-Piezo-Electromagnitic

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Abstract: The aim of this paper is concerned with the mathematical analysis of a contact problem in a thermo-piezo-electromagnetic material with Tresca friction a law condition. A variational formulation of the model in the forme of a coupled system for displecement, electric potential, magnetic eled, and temperature is derived. Existence and uniqueness of the solution are proved using the results of variational inequalities and a xed point theorem.

Displacement Electromagnetic Sensor and its Applications in the fields industrial and environmental

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Abstract: This article describes a new displacement electromagnetic sensor and its applications

in the sector of engineering field and environmental control. The present sensor is based on a two coil induction principal was adopted for converting the mechanical motion to electric energy with direct contact with measuring subject. The output signal can be fed electronic circuit. The voltage output change from sensor is captured on a data acquisition system. By correlating the time between the two peaks in voltage and the known between the coils, the displacement of the moving object is determined. The measured data are transmitted to a Pc in real time via a DAQ (NI USB -6281).This paper describes also the data acquisition analysis developed specially for sensor signal monitoring and used with car electronic of conditioning. The Data is then recorded and viewed using a user interface written using National Instrument LabVIEW software. On-line displays of time and voltage of the sensor signal provide a user-friendly data acquisition interface. The sensor provides an uncomplicated, accurate, reliable, inexpensive transducer for highly sophisticated control systems.

Modeling and synthesis of a medical Robot for echography application

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Abstract: Robots have been and continue to be essential components of medical field. Robots are widely used in tele-echography diagnosis, this technique is fast, easy and cheap to perform and the patient can be given a diagnostic immediately. A tele-echography robot allows medical expert to perform this clinical act on a distant patient.

The kinematic and dynamic analysis of the robot, for any applications whether in medical field or another, is very important for their design and control. The direct aim is to properly select the workspace and the actuator size.

This paper describes a robot architecture of medical manipulator system for tele-echography application. This application is characterized by relatively large angular mobility about a single point, which is that the probe is placed over the organ to be explored and is, then oriented around the point of contact with skin. So, The desired kinematic structure must be able to orient an object in the space by providing a remote center of spherical movement of the

structure.

These considerations have led us to develop a mechanism that realizes rotational and translational motions of tool at a point some distance from the mechanical structure of the robot. The proposed robot consists of using a five-bar linkage mechanism in order to produce the movement required by the application. To evaluate the performance of this system, a geometrical model and simulation of workspace was presented.

Conception et réalisation d'une IHM pour le contrôle d'un stimulateur électrique

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Abstract: Le concept d'Interface Homme Machine ou Interaction Homme Machine (IHM) était une nécessité pour faciliter l'utilisation de la technologie, et l'évolution des sciences et technologies de l'information donnent tendance Êller vers des systèmes interactifs de plus en plus conviviaux, intelligents et adaptés aux besoins des utilisateurs. Dans ce travail, nous proposons une IHM dédiée Ãla commande et la supervision d'un système de stimulation électrique en utilisant LabVIEW. Ainsi, nous avons conÃ§u une interface graphique pour l'utilisateur (GUI) basé sur deux types de commande d'amplitude du signal : manuelle et automatique. L'interface matérielle est une carte d'acquisition de National Instrument NI-USB 6281. Elle est utilisée pour commander, via une sortie analogique, l'amplitude des stimuli générés par le stimulateur électrique et aussi pour acquérir et visualiser les différents signaux du stimulateur. La conception de la GUI est basée sur différents principes ergonomiques pour faciliter l'interaction de l'utilisateur (médecin ou patient) avec la machine de stimulation électrique et permettre une flexible programmation de la commande automatique avec divers possibilité de paramétrage dynamique.

proach can also be applied to other nonlinear fractional differential equations.

New exact solutions for the generalized fractional Boussinesq B(m, n) equation

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Abstract: In this paper, the fractional derivatives in the sense of modified RiemannLiouville derivative and extended trial equation method are employed for constructing the exact solutions of nonlinear time-fractional partial differential equations. Based on the fractional derivative in the sense of modified RiemannLiouville derivative and traveling wave transformation, the fractional partial differential equation can be turned into the nonlinear non-fractional ordinary differential equation. As a result, some new exact solutions to this nonlinear problem is successfully constructed such as elliptic-E function, elliptic-F function and elliptic-Pi function solutions, hyperbolic function solutions and single kink solution. This approach can also be applied to other nonlinear fractional differential equations.

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Comparative Study of Advanced Controllers: Application for a Robot Manipulator

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Abstract: The robot manipulator is a mechanical system multi-articulated, in which an electric actuator drives each articulation individually is the most robot used in industry, Many efforts have been made in developing control scheme to achieve the precise tracking control of robot manipulators.

The traditional PID controller with simple structure and stable performance is widely used. But it is difficult to meet the high precision and fast response, moreover the parameters tuning of classical PID controller is so complex .Therefore fuzzy algorithm is introduced. Fuzzy control is a particular type of intelligent control, has a great potential since it is able to compensate for the uncertain nonlinear dynamics using the programming capability of human control behavior. The main features of fuzzy control is that a control knowledge base is available within the controller and control actions are generated by applying existing conditions or data to the knowledge base, making us of inference mechanism. Also, the knowledge base and inference mechanism can handle no crisp, incomplete information; the knowledge itself will improve and evolve through learning and past experience. Fuzzy logic control does not require a conventional model of the process, whereas most conventional techniques require either an analytical model or an experimental model. Fuzzy logic control is particularly suitable for complex and ill-defined process in which analytical modeling is difficult due to the fact that the process is not completely known and experimental model identification is not feasible because the required inputs and output of the process may not be measurable. The Adaptive Neuro-Fuzzy Inference

System combines the concepts of fuzzy logic and neural networks to form a hybrid intelligent system that enhances the ability to automatically learn and adapt.

In this work after the system modeling, simulation and control robot manipulator using two articulations for motion using MatLab/Simulink software were carried, when the proposed Anfis controlled is used to improve the articulation robot stability. Three types of control PID, Fuzzy logic and Anfis were studied; analysis and comparative studies were made.

Vibration Analysis of Square Plate with a Piezoelectric Patch using the Differential Quadrature Method : Regularization of the Dirac-delta Function for Numerical Solution

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Abstract: La méthode de quadrature différentielle (DQM) est l'une des méthodes les plus élégants et les plus efficaces pour la résolution numérique des équations aux dérivées partielles résultant en ingénierie et en sciences appliquées. Il est simple Ãutiliser et aussi facile Ãmettre en Å“uvre. Cependant, l'MQD est bien connu pour avoir quelques difficultés lorsqu'il est appliqué Ã des équations différentielles partielles impliquant des fonctions singulières comme la fonction de Dirac-delta. Ceci est provoqué par le fait que la fonction de Dirac-delta ne peut pas être directement discrétisé par l'MQD. Pour surmonter cette difficulté, cette communication présente une procédure simple en quadrature différentielle dans lequel la fonction de Dirac-delta est remplacé par des fonctions lisses régulières-siée.En régularisant la fonction de Dirac-delta, telle fonction singulière est traité comme des fonctions non-singulier et peut être facilement et directement discrétisé en utilisant l'MQD. Pour démontrer l'applicabilité et la fiabilité de la méthode proposée, il est appliqué ici pour résoudre le problèmes de

vibration d'une plaque carré avec un patch piézoélectrique, oÃ¹ la force appliquées par le patch est décrit par une fonction de Dirac-delta. Les résultats obtenus par la méthode proposée sont comparés avec les résultats analytiques et numériques disponibles dans la littérature.

Keyword : Numerical Analysis; Differential quadrature method; Vibration

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One-dimensional Oldroyd-B model of pulsatile blood flow in constricted tapered artery : effects of body acceleration and slip velocity

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Abstract: In this this talk we deal with the pulsatile flow of blood in stenosed arteries. One of the most frequently used constitutive models for the viscoelasticity of blood is the Oldroyd-B model. The effects of the body acceleration and the slip velocity are also examined. The axial velocity, flow rate, and wall shear stress were obtained analytically by use of the finite Hankel transform and the Laplace transform. The obtained results are compared with the existing theoretical observations. This mathematical model gives a simple velocity and shear stress expression for blood flow so it will help in the field of physiological fluid dynamics and also help medical practitioners with elementary knowledge of mathematics.

Keywords : Oldroyd-B fluid; Blood Flow; Tapered Artery; Stenosis; Periodic Body Acceleration; Slip Velocity; Finite Hankel Transform; Laplace Transform.

The Discrete Homotopy Perturbation Method for Solving Fractional Partial Differential Equations

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Abstract: In this paper, the discrete Homotopy Perturbation Method (DHPM) is proposed to solve the linear as well as nonlinear fractional partial differential equations. DHPM is extended to find the solution of fractional discrete diffusion equation, nonlinear fractional discrete Schrodinger equation and nonlinear fractional discrete Burgers equation.

Keywords: Discrete Homotopy Perturbation Method; Caputo fractional derivative; fractional discrete diffusion equation; fractional discrete Schrodinger equation; fractional discrete Burgers' equation.

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Critical Values for some non-classA geometries in thermal ignition theory

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Abstract: In this work, the authors used a path-following method for the two point boundary value problem governing the ignition of a solid reactant undergoing slow oxidation for some non-class A geometries (infinite square rod and cube), making use of finite difference discretization of the boundary value problem and showed the occurrence of multiplicity of steady states. It is shown that the multiplicity of steady states changes and that the critical parameters are also different from those found from the shape factor approach.

Keywords : nonlinear systems, Combustion, Boundary value problems.

Existence of solutions for a second order nonlinear coupled system with nonlinear-coupled boundary conditions

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Abstract: In this Talk, the existence of solutions of nonlinear coupled system with nonlinear coupled boundary conditions will be discussed using coupled lower and upper solutions approach. Arzela Ascoli and Schauder's fixed point theorems will be our important tools to establish the existence. Some examples will be discussed to verify the theoretical results.

Modélisation et simulation paramétrique d'un aérogénérateur

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Abstract: Aujourd'hui les énergies renouvelables sont devenues un intérêt pour le monde entier, étant donné qu'elles sont propres et durables. Cet intérêt est aperçu par les gros financements destinés à la recherche scientifique en ce domaine. Et comme que notre région contient tous les sources d'énergies renouvelable (chaleur, vent et eau), cet étude vient confirmer notre préoccupation par la recherche de nouvelles techniques de mise en profit de ces ressources. Ce travail se focalise sur les performances de l'hélice éolienne en analysant les phénomènes physiques existant dans l'interaction fluide structure et de calculer les paramètres optimaux. Le travail comporte d'une part la modélisation de la pale qui sert à évaluer les paramètres essentiels à la conception d'un aérogénérateur et d'autre part la simulation de l'élément principal de l'hélice, afin de comprendre l'effet de l'interaction vent turbine.

Modified fixed point and optimized domain decomposition for a nonlinear anisotropic equation

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Abstract: This work is devoted to an optimized domain decomposition method applied to a non linear anisotropic reaction equation. The proposed method is based on the idea of the optimized of two order (OO2) method developed this last two decades.

We first use the fixed point technique to linearize the problem and then we generalize the OO2 method and modify it to obtain a new more optimized rate of convergence of the Schwarz algorithm.

To compute the new rate of convergence we have used Fourier analysis. For the numerical computation we minimize this rate of convergence using a global optimization algorithm.

Several test-cases of analytical problems illustrate this approach and show the efficiency of the proposed new method.

Application du radar sous sol pour valoriser les informations prélevées

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Abstract: Les radars géologiques ou GPR (Ground Penetrating Radar), sont des systèmes électromagnétiques utilisées pour l'étude, non destructif, du sous sol. Ils sont basés sur l'émission, par une antenne couplée à la terre, d'impulsions électromagnétiques de courtes durées ou peu fréquent, d'ondes harmoniques balayant une certaine bande de fréquence [1]. Dans le cadre de cette communication, l'objectif est de présenter quelques résultats dans le domaine archéologique obtenus, en effectuant des mesures sur le site Ciavieja d'El Ejido au sud de l'Espagne.

Etude et Modélisation d'une Ligne Micro-Ruban Blindée à l'aide du Méthode des Moments

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Abstract: Une approche rigoureuse combinée fondée sur la méthode des moments (MoM) et les fonctions de Green ont été présentée dans ce travail pour la modélisation numérique d'une ligne micro-ruban. Dans un premier temps, est à l'aide de la fonction du Green, déterminé par la méthode de Fourier, en aboutir à une équation intégrale de densité de charge de la ligne micro-ruban. Nous proposons ensuite la résolution de cette équation à l'aide de la méthode des moments, puis calculé la densité de charge, la capacité, et l'impédance caractéristique d'une ligne micro-ruban. Enfin, nous étendons l'étude sur la convergence et le temps d'exécution de la méthode des moments, puis comparer avec d'autres travaux publie.

Splitting methods for PDEs

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Abstract: In this paper we present the operator splitting method for PDEs and especially for the non linear reaction diffusion equations. This method has been applied to complex problems for many years and gave very satisfactory results.

Our goal in this paper is to propose firsly the framework of the splitting method and to give an overview about different splitting approaches developed in literature especially for multi-scale problems. Secondly we describe algorithms derived from these approaches and we give some numerical test cases in order to illustrate the interest of such algorithms. We finish this document with concluding remarks and perspectives concerning future development of the operator splitting method in particular in the context of multi-scale and multi-physics problems.

Vector Epsilon Algorithm for accelerating the non linear Schwarz iterations

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Abstract: The vector epsilon-algorithm is an effective technique used for accelerating the convergence of vector sequences derived in particular from the discretization of nonlinear PDEs.

In this paper, this method is used to accelerate the convergence of Schwarz iterations of a large class of non linear reaction-diffusion problems.

The proposed algorithm is very useful when the large systems of linear or nonlinear equations have to be solved at each time step, with one or more unknowns per grid block, depending on

the formulation of the discrete problem.

Several test-cases of analytical problems are performed in order to illustrate the interest of such algorithm.

The obtained results show the efficiency of the proposed approach on large number of numerical tests. On the other hand, we noticed that the effectiveness depends on the nature of the non linearity of the equation.

Existence and multiplicity results for elliptic problems with nonlinear boundary conditions and variable exponents

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Abstract: Using variational methods, we prove in a special case the existence and multiplicity of solutions for the following elleptic problem:

-div(a(x,∇ u)+|u|^(p(x)-2) u=0 in Ω ; a(x,∇ u).μ=α(|u|^(q(x)-2)u-|u|^(r(x)-2) u) on ∂Ω.

Where α∈ R^+, Ω is a bounded domain of smooth boundary.

Analytical model of Threshold Voltage and Subthreshold swing for Dual Metal Gate- Graded Channel-Dual Oxide Thickness and Surrounding Gate MOSFET: DMG-GC-DOT SG MOSFET

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Abstract: With the reduction in channel length, short-channel effects (SCEs) impose a physical limit on the ultimate performance of traditional planar metal-oxide-semiconductor field effect

transistors (MOSFETs). In recent years, various alternative structures have been proposed to overcome these shortcomings, among them cylindrical surrounding gate MOSFETs (SG) offers the best control of SCEs, and is considered one of the most promising devices. Moreover, SG can be used to build very high density integrated circuits for its extremely small dimensions. In this work, we study analytical model such threshold voltage (Vth) and Subthreshold swing (SS) for a new Surrounding Gate MOSFET. This new SG-MOSFET is composed of Dual-metal Gate (DMG) M1 and M2 with different work function, Graded Channel (GC) which the doping is higher near the source side than the drain side and Dual Oxide Thickness (DOT). The analytical model for Vth and SS are developed by solving 2D Poisson equation using parabolic approximation method. Results for new structure device are compared to those obtained by numerical simulation and have been found to be in good agreement.
Comparative study between (DMG-GC-DOT) SG MOSFET and with different device engineering shows that the new structure provides improved electron transport and reduced short channel effects (SCE).

Inverse problems for singular parabolic equations with interior degeneracy

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Abstract: In this communication, we investigate the question of inverse source problems relative to a class of linear singular parabolic equations with a diffusion coefficient degenerating in the interior of the spatial domain. For this purpose, we use and extend some recent Carleman estimates for degenerate/singular equations obtained by Fragnelli and Mugnai. Finally, we establish Lipschitz stability for the source term by the observation data at a given time T'.

Adomian Decomposition Method for Computing the Geodesic Curves

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Abstract.: Geodesics on smooth surfaces can generalize the idea of straight lines whose length does not decrease if it is perturbed in a small neighborhood of any point (disrupted in a small area at any point). From the differential equations viewpoint, geodesics solve the initial value problem which states that from any point of a manifold there starts a unique geodesic in any direction. This initial value problem can be expressed as the system of nonlinear ordinary differential equations with respect to Riemannian metric of the surface under consideration. In this study, we present Adomian Decomposition Method for the solution of such system and demonstrate our results on some well-known surfaces.

Keywords: Adomian decomposition method, nonlinear equations, geodesic curves.

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Global existence and long time behaviour of a non local model in ferromagnetism

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Abstract: We are dealing with a non local model describing magnetization dynamics in ferromagnets. The model generalizes classical Landau-Lifshitz equation by adding a non local term to the effective field. We prove a global existence result and study the long time behaviour of the obtained solutions.

Probability in hypergeometric

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Abstract: In this paper, two numbers were selected random and respectively in the interval [0,1] and probability of being greater first one than the second one was calculated. Then,it was found that this probability is the same with the numbers taken from two regions having equal volume in 2-cube. ([0,1]x[0,1]) Also, by generalizing this process, probability of realization being an increasing sequance of points taken from regions with the equal volume was calculated in n-cube . ([0,1]x[0,1]x...x[0,1]).

Keywords: Hypergeometry, Hypercube, Probability in Hypergeometry,n-Cube,Probability in n-Cube.

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points of paper.

Dark Soliton Solutions of Coupled Higgs Equation and Nizhnik-Novikov-Veselov System

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Abstract: In this paper, we establish exact solutions of coupled Higgs equation and Nizhnik-Novikov-Veselov (NNV) system. We apply generalized Kudryashov method (GKM) to find exact solutions of coupled Higgs equation and NNV system. Firstly, we obtain dark soliton solutions of coupled Higgs equation by means of GKM. Then, we find dark soliton solutions of NNV system by the help of GKM. As a result, for certain parameter values, we draw two and three dimensional graphics of imaginary and real values of some dark soliton solutions that we obtained by using this method. Numerical results together with the graphical demonstrations clearly present the reliability of this method. Moreover, it is observed that the proposed method is consonant with the physical structure of such equations.

Keywords: Coupled Higgs equation, Nizhnik-Novikov-Veselov system, generalized Kudryashov method, dark soliton solutions.

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On the complex analytical solutions for the fractional nonlinear double Sine-Poisson equation

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Abstract: In this study, we constitute Improved Bernoulli sub-equation function method. This method is based on the Bernoulli Sub-ODE method. We explain the general properties of proposed method, and then, apply this method to the fractional nonlinear Double Sine-Poisson equation. This gives us some new analytical solutions such as hyperbolic and complex function solutions. We investigate analytical solutions in physical explanations by drawing two and three surfaces of solutions. Finally, we submit a comprehensive conclusion by considering important points of paper.

Model-based variable correlation in design of experiments : Application to furnace of annealing of the line of galvanization industry

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Abstract: correlation issues in real datasets, in particular industrial datasets, motivated this thesis. The main idea stands in explicit modeling of the correlations between covariates by a structure of experimental design that simply is a system of design of experiments between the covariates. It points out redundant covariates that can be deleted in a pre-selection step to improve matrix conditioning without significant loss of information and with strong explicative potential because this pre-selection is explained by the structure of design of experiments, it self-easy to interpret.

This method gives results but is very expensive in time because it inevitably requires the realization of a great number of experiments. This is why it is important to help the scientist to achieve his experiments with variable correlation and experimental design methods. Variable correlation makes it possible to collect, summarize and present data so as to optimize the way to implement next experiments. By using experimental design, the scientist knows how to plan experiments. This experimental step will help him to structure his research in a different way, to validate his own assumptions, with better understanding the studied phenomena, and to solve the problems.

To help to answer this problem, a method of modeling by data mining of systems was implemented; the experiment cannot be anything, she has to supply the wished information. This experimental approach is going to help the experimenter to structure its search in a different way, to confront and to validate its own hypotheses, to understand better the studied phenomena and to solve the problems. The success of this methodology is partially bound to the needs for competitiveness of companies but also, to the desire to change the way of making experiments.

The challenge is to provide a simple and sufficiently concrete solution to bring real

improvements to the process of annealing of the galvanized products, while staying in compliance with the requirements of the standard.

Chaotic optimization algorithm based on the modified probability function of Lozi map

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Abstract: Recently, chaos theory has been used in the development of novel techniques for global optimization, and particularly, in the specification of chaos optimization algorithms (COAs) based on the use of numerical sequences generated by means of chaotic map. In this paper we propose new technique to improve the chaotic optimization algorithm, by using some transformation to modify the density of the map instead of changing it.

Dark and New Travelling Wave Solutions to the Nonlinear Evolution Equation

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Abstract: In this study, we have applied two effective methods to the nonlinear evolution equation. One of them is improved Bernoulli sub-equation function method (IBSEFM) the other is modified $\exp\left(-\Omega\left(\xi\right)\right)$-expansion function method (MEFM). We have obtained some new analytical solutions such as complex function, hyperbolic function and rational function solutions. We have observed that all analytical solutions have been verified the nonlinear partial differential equation by using Wolfram Mathematica 9. Then, we have constructed the two and three dimensional surfaces for all analytical solutions obtained in this paper by the

same computer program.

Keywords: The Bernoulli sub-equation function method, the Improved Bernoulli sub-equation function method, modified $\exp\left(-\Omega\left(\xi\right)\right)$-expansion function method the nonlinear evolution equation, complex function solution, hyperbolic function solution.

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Laplace Transform Method and Adomian Decomposition Method For Solving Nonlocal Problems

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Abstract: In this work we show an application of the Laplace Adomian de- composition method (LADM) to initial-boundary value problems for linear and non linear parabolic and hyperbolic partial differential equation subject to nonlocal boundary conditions of integral type cases.

This method provides us astraight forward accurate and quite effcient technique in comparison with the other usual classical methods.The results are also veriffed by some examples in the discussion.

Résultat de positivité pour une équation biharmonique sous les conditions au bord de Dirichlet

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Abstract: Dans ce travail, on montre un résultat de dichotomie donnant une propriété de préservation de la positivité pour une équation biharmonique sous les conditions au bord de Dirichlet. Cette équation apparait dans les MEMS (Micro-Electro-Mechanical Systems) et les NEMS (Nano-Electro-Mechanical Systems).

Poster sessions

The effect of weather conditions and dust on the efficiency of PV panels in South-East of Morocco

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Abstract: The yield of the photovoltaic (PV) panels is even lower. Also, PV performance is affected by high cell temperature soling, mismatch, shading and other balances of system related losses. The objective of this research was to study the weather parameters and deposited solid particles on the solar PV panels located on the Physique Department at the Faculty of Science and Technology Errachidia. The PV module which is studied in this research consists of eight panel 255W type Sunmodule plus SW 255 mono. We have observed in our region that the most of the dust, which was accumulated on the surface of the solar panel, is bird dropping which come from the bird that locate on the edges on the inclined panel. There is also evident of soil. The data was provided by a weather station implemented in our laboratory. It was found from the comparison of both cleaned and dirty panel that the accumulated dust on the surface of PV solar panel can reduce the system's efficiency.

3D Human Face Modeling: A literature survey

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Abstract: 3d face modeling is the very first step towards 3d assisted face recognition and a major requirement for pose invariant face recognition. it also provides the possibility to correct for illumination problems of 2D face using its pose and depth information from person specific or a generic 3D human face. In this paper, we try to address and review the approaches and techniques used in the past decade for modeling the human face in the 3D domain. Our discussion also shows the pros and cons of each approach used in the 3D face modeling.

Simulation study of the solar flux captured by PTC, in southeastern Morocco (Errachidia province)

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Abstract: With an impressive solar radiation benefiting throughout the year of a strong and steady sunshine on average 5.5 KWh/m2.day, the climate of the province Errachidia is continental semi-arid characterized by a large gaps temperature, either seasonal or daily. In The actual paper, the potential of direct solar radiation captured by a parabolic trough concentrator has been estimated through combining simulations and using the different mathematical models, the atmospheric parameters, optical characteristics and the geometric characteristics of PTC. In order to evaluate and predict the intensity of solar-radiation for different orientations and type of tracking, we have developed a detailed simulation to plot the curves and 3D graphics during sunny hours, from the sunrise to the sunset, hour by hour for one year, considering a non-uniform distribution of the flow solar on the absorber tube when the PTC tracked the sun.

Key words: parabolic trough concentrator, tracking systems, geometric and atmospheric parameters, optical characteristics, 3D: three dimension

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Liaison radio sur fibre utilisant un système hybride OFDM / SAC- OCDMA

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Abstract : Compte tenu des évolutions rapides des services de télécommunications accessibles aux usagers, notamment les services multimédias enrichis comme l'Internet à très haut débit, l'IPTV, la visiophonie, la TV Haute définition, les futurs réseaux d'accès et réseaux domestiques devront bientôt être capables de transporter des flux de données pouvant atteindre le gigabit par seconde. Cette demande en très hauts débits va largement au-delà des possibilités offertes par les solutions actuelles à base de câble coaxial (ADSL, VDSL, etc). Les fournisseurs de réseau

sans fil sont à la recherche des nouvelles solutions permettant simultanément d'augmenter le débit de transmission de données et d'économiser le coût, afin d'offrir des services intégrés à large bande.

La technique radio sur fibre et les composants photoniques sont donc la clé technologique pour la conception des futurs réseaux d'accès sans fil, c'est une solution potentielle pour combiner la capacité des réseaux optiques avec la souplesse et la mobilité des réseaux d'accès sans fil. Une des techniques prometteuses pour maintenir des débits très élevés est l'utilisation du réseau optique passif (PON).

Multiplexage par répartition orthogonale de la fréquence (OFDM) est considéré comme une méthode de modulation pour les futurs systèmes des réseaux optiques sans fil. Le rôle important de l'OFDM dans le codage des signaux numériques à plusieurs fréquences porteuses fait de lui un format de modulation appropriée dans un tel système optique sans fil. D'autre part, la technique SAC-OCDMA (Spectral Amplitude Coding Optical Code Division Multiple Access) permet d'améliorer le taux de système de données et d'augmenter le nombre d'utilisateurs.

Dans cet article, nous étudions les performances de lien ROF en utilisant une technique OFDM/SAC-OCDMA hybride. Pour un faible impact de bruit d'intensité de phase induite (PIIN), les codes choisis doivent avoir de bonnes propriétés de corrélation.

Mots clés : Radio sur Fibre, SAC-OCDMA, OFDM, PON, réseaux d'accès.

Modélisation du comportement statiques et dynamique des joints labyrinthes dans les turbomachines

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Résumé : Les joints labyrinthes sont, en général, utilisés dans les turbomachines (turbines, pompes, compresseurs, ...). Ils se comportent comme des paliers hydrodynamiques et peuvent

modifier les caractéristiques dynamiques de la ligne d'arbre dans laquelle ils sont intégrés. Il existe plusieurs types de joints labyrinthes correspondant à des conditions de fonctionnement spécifiques.

Depuis les années quatre vingt, plusieurs auteurs ont mené des recherches théoriques et expérimentales pour tenter de donner des prédictions sur le comportement statique et dynamique des joints labyrinthes. Citons à titre d'exemples les travaux de Benkert et Wachter [1], Kirk [2], Childs et Scharrer [3,4] et Pelletti [5].

Depuis 1991, nous nous sommes penchés sur la détermination du comportement statique et dynamique de ces joints en utilisant des moyens théoriques et expérimentaux [6]. L'étude théorique est basée sur un modèle de Childs et Scharrer [4], dont l'expression du débit de fuite au droit des dents a été remplacée par une nouvelle corrélation, obtenue par un calcul local axisymétrique, tient compte de la géométrie du joint et du nombre de Reynolds associé à la vitesse de rotation [7-8].

Ce travail consiste à déterminer les effets des paramètres physiques sur le comportement dynamique des joints labyrinthes pour un écoulement compressible. Au cours de ce travail, nous avons comparé le comportement de deux joints labyrinths : l'un à dents portées par le rotor (JDPR), l'autre à dents portées par le stator (JDPS).

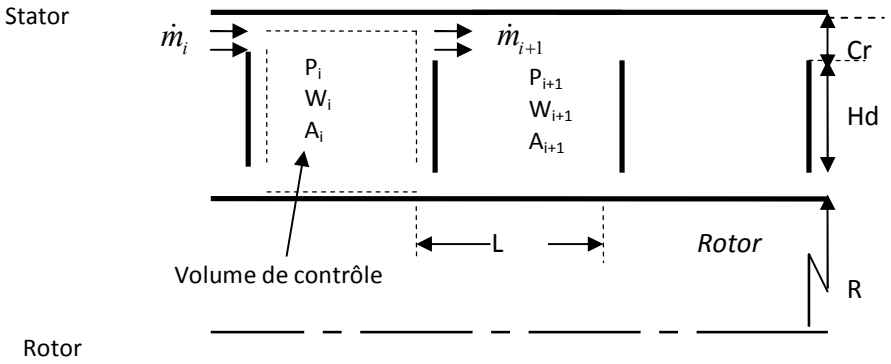

Figure 1: Modèle du joint labyrinthe

Mots clés : Turbomachines à gaz**,** Joint labyrinthe, rotor/stator, raideur-amortissement, comportement statique et dynamique.

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Application de la géophysique à la définition de l'emplacement des zones métallifères au niveau des formations Paléozoïques de l'Anti Atlas oriental

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Abstract: La chaîne de l'Anti-Atlas du Maroc est située sur la bordure nord du craton ouest africain. Sa forme générale est un vaste anticlinal d'orientation ENE-WSW, formé en son coeur de boutonnières de socle et sur ses flancs de couverture plissée. Le socle Précambrien recèle les traces des orogenèses Eburnéen (2 Ga) et Pan Africain (600 Ma). Dès la fin du Néoprotérozoïque, un rift initie un nouveau cycle de Wilson. A l'issue de la sédimentation syn-rift, le rift est avorté, mais une subsidence régulière a mis en place une épaisse couverture Paléozoïque dans un environnement de mer peu profonde. Ce bassin intracontinental est inversé au Carbonifère moyen, créant ainsi la chaîne plissée de l'Anti Atlas.

La tomographie électrique en polarisation provoquée (PP) est un outil incontournable à la définition de l'emplacement des zones minéralisées. L'investigation par cette technique pourra atteindre jusqu'à 100m de profondeur. C'est la raison pour laquelle nous l'avons utilisée pour prospecter les formations de Tizi n'Mkhezni situées au voisinage de la zone d'Ait Aissa Oubrahim et formée essentiellement de conglomérats de base et de schistes noire à graptolites

et sous forme disséminée. L'objectif de cette étude est de mettre en évidences les discontinuités au sein de ces formations et leur liaison avec les filons métallifères en place.

Les profils en pseudo-sections obtenues ont permis de localiser d'importantes zones d'anomalies attribuées à l'emplacementde cette minéralisation et notamment aux filons polymétalliques de cuivre (Cu), de barytine (BaSo4) et de galène (PbS).

Bandes interdites photoniques des hétérostructures isotropes unidimensionnelles

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Abstract: La propagation des ondes électromagnétiques dans les cristaux photoniques unidimensionnels a fait l'objet de plusieurs études au cours des dernières décennies. L'objectif de ce travail est de déterminer les propriétés optiques des systèmes photoniques unidimensionnels périodiques En utilisant la méthode de la fonction de Green. Avec un choix approprié des matériaux et de la géométrie des cristaux photoniques, il est possible de fabriquer une structure qui présente une grande largeur de bande interdite photonique. Nous présentons une étude du spectre de transmission en incidence normale et oblique d'une structure périodique prise en sandwich entre deux milieux semi-infinis (le vide). Cette structure est formée de deux milieux A et B d'indice de réfraction 1.644 et 4.052, respectivement, et pour différents épaisseurs de A et B.

La simulation numérique de la propagation des ondes dans cette structure, nous a permis de conclure que :

- Plus le nombre de couches formant le super réseau est important plus les limites du gap seront bien définies.
- Plus le contraste d'indice entre les couches du réseau est élevé plus nous pouvons prévoir une

largeur importante de la bande interdite.

- Selon que l'on désire avoir des gaps en haute ou en basse fréquences, nous pouvons systématiquement agir sur la structuration du réseau pour répondre à certains besoins.
- L'incidence a un impact considérable car plus elle augmente plus l'intervalle du gap est élevé.

Pour mieux contrôler d'avantage la propagation des ondes à travers ces structures, il faudrait passer de l'unidimensionnel au bidimensionnel voir même tridimensionnel mais ceci représente l'objet d'une autre étude beaucoup plus soignée.

Mots clé : Ondes électromagnétiques, Bande interdite photonique, Fonction de Green

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Propagation and localization of electromagnetic waves in photonic Kolakoski multilayers

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Abstract: The study of aperiodic structures is interesting in view of both fundamental physics and practical applications. Nowadays, the layered aperiodic media have found applications in the design of rectors, polarizers, microcavities, all-dielectric coaxial and planar waveguides, etc. In this communication, we pay attention to aperiodic systems, which are constructed according to the classical and generalized Kolakoski schemes. It was shown that such structures exhibit certain distinctive features compared to traditional periodic and random media. The aim of this communication is to study the propagation and localization of the electromagnetic wave in the

Kolakoski structure. In particular, we study the transmission spectrum through Kolakoski structure which is formed by two medias A and B with the refractive index of 1.47 and 4.7, respectively.

Key Word: electromagnetic wave, aperiodic structures, Kolakoski structure.

Simulation numérique des performances d'une cellule solaire en CIGS par le logiciel SCAPS 1D

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Abstract: L'énergie solaire est la source d'énergie la plus prometteuse et la plus puissante parmi les énergies renouvelables. L'intérêt des cellules solaires à base de CIGS a augmenté de façon significative en raison de ses caractéristiques prometteuses pour la haute efficacité, la stabilité et le faible coût. Aujourd'hui la technologie CIGS exhibe le meilleur rendement de conversion de plus de 21% en laboratoire et est supérieur, d'après les chercheurs de ZSW en Allemagne, à la valeur record de 20.4% obtenu pour le silicium multicristallin [1-3]. Dans cette communication nous avons utilisé le code de simulation SCAPS-1D pour l'étude des caractéristiques de ces dispositifs. Nous sommes intéressés à optimiser les performances des cellules solaires en couches minces : ZnO: Al/i-ZnO/CdS/CIGS/Mo.

Plus particulièrement, nous avons réalisé une étude des paramètres de la cellule, en fonction de la température (T), le gap (Eg) et l'épaisseur (d) de la couche absorbante. Le rendement électrique optimale obtenu est de l'ordre de 18.8% pour d = 1,3ï -m et Eg = 1.7eV avec un facteur de forme de 76.04%. Ces paramètres sont sensibles Ãla température.

Mots clés : Cellules solaires en CIGS, Simulation numérique, wxAMPS-1D

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Propriétés optique des hétérostructures anisotropes unidimensionnelles

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Abstract: L'étude de la propagation des ondes électromagnétiques dans les structures périodiques unidimensionnelles a suscité beaucoup d'intérêt au près des chercheurs, du fait que ces structures présentent des propriétés physique nouvelles. Elles sont actuellement la source de nombreuses applications [1-3] telles que les réflecteurs diélectriques [1,2], les guides d'ondes [3] et autres composants utilisés en télécommunications. Dans ce travail, nous avons étudié les propriétés des ondes optiques se propageant dans une hétrostructure, constituée par un empilement périodique d'un seul matériau anisotrope (biaxe ou uniaxe) mais avec différentes orientations des axes principaux des lames formant la structure. Les coefficients de réflexion et de transmission et les structures de bandes obtenus à partir de la théorie de réponse d'interface [4], nous ont fournis des informations importantes concernant l'évolution des ondes électromagnétiques dans les hétérostructures anisotropes unidimensionnelles.

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A comparison of Power Flow Analysis Using Newton Raphson and Gauss-Seidel Methods

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Abstract: Abstract»” The power flow (load-flow) analyses are a numerical analysis of the flow of electric power in an interconnected system. The power flow analyses are important for planning future expansion, control, and management of power systems as well as in determining the best operation of existing systems. The principal information obtained from the power flow analyses are the magnitude and phase angle of the voltage at each bus, and the real and reactive power flowing in each line. The steady-state performances of an interconnected power system can be modeled from a polynomial system equation in several variables called load flow equations where numerical methods should be used to approximate the solutions. The most popular methods for solving this load flow problem are the Newton Raphson method and Gauss–Seidel method.

In this paper the Newton-Raphson method and Gauss-Seidel method are compared. The performances of these methods are assessed from four aspects: number of iteration, computational time, tolerance value and convergence. The simulation is carried out using Matlab for test cases of IEEE 3-Bus, IEEE 5-Bus, IEEE 14-Bus, IEEE 30-Bus and IEEE 57-Bus systems. The compared results show that the Newton-Raphson is the most reliable method because it has the least number of iteration and converges faster.

Keywords»” Convergence Time, Gauss-Seidel Method, Newton-Raphson Method, Number of Iteration, Power Flow Analysis.

Enhancing the Key Pre-Distribution Scheme on Wireless Sensor Network using Elliptic curve and Modified Knapsack Algorithm

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Abstract: With the development of computers, there has been strong demand for means to protect information and to provide security. Elliptic Curve Cryptography (ECC) is widely deployed in wireless devices, where computing power, memory and battery life are limited, owing to its signicant advantages over RSA. Many applications are dependent on the secure operation of a Wireless Sensor Networks (WSN), and have serious effects if the network is disrupted. Therefore, it is necessary to protect communication between sensor nodes. To achieve security in wireless sensor network, key pre-distribution is essential. This paper focuses on the performance advantages of using ECC in the wireless network. This paper proposes a novel approach to enhance the security of the key pre-distributed scheme based on elliptic curve and a Modified Knapsack algorithm. Compared with existing key pre-distribution schemes, the proposed method could signicantly improve the performance of the sensor nodes. The results show that proposed approach is more suitable for WSN.

Localized surface plasmon resonance study (LSPR) of graphene layers as a separating layer of subnanometric thickness in a system of metallic nanoparticles.

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Abstract: We study the interaction of gold nanoparticles with a graphene film; graphene is used as the thinnest separating element between gold nanoparticles and the electric medium for detection. We focus our study on the change of the structure of localized surface plasmon

(LSP) according to the thickness of the layer of graphene. A stronger behavior of the position of resonance in the transmission spectrum indicates a strong coupling between the LSP on gold nanoparticles and the covering film. Numerical simulations indicate an offset of the resonance wavelength structure SiOx/Au NPs/Graphene/SiOx compared with experimental results obtained on SiOx/Au NPs/SiOx, with location of the points of the electric field on the best corners of the nanoparticles of gold-graphene.

Keywords: Gold nanoparticle. Graphene film. Localized surface plasmon resonance.

New semi-empirical model for rheological properties of pseudo plastic complex fluids

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Abstract: The goal of this study was to propose a new semi-empirical model to investigate the rheological properties principally of ketchup with different botanical origin, as a thickener for sauces, ketchup type. The material consisted of natural starches: waxy maize, corn and potato, modified with a cross-linker comprising acetic anhydride and adipic acid. Research on: rheology, color, texture and acidity of the finished product. It was found that all the sauces in terms of rheological fluids were pseudoplastic flow from abroad. The biggest apparent viscosity was characterized by ketchup with the addition of waxy maize starch, then: with potato starch and corn. Texture profile parameters studied sauces differed slightly from the parameters of commercial ketchups, and the largest differences occurred in the hardness and adhesiveness. The use of resistant starch preparations for sauces had a positive effect on their color. Botanical origin of starch had no effect on the pH of the tested products.

The proposed equation, with two physical parameters, is in a good agreement with the experimental data and is generally better than the previous empirical equations of Ostwald-de Waele, Herschel-Bulkley and Casson.

Key words: Modeling, rheology, shear stress, pseudoplastic fluid, ketchup.

Etude d'une antenne planaire à miroruban multi-bandes avec défections sur le plan de masse et sur l'élément rayonnant

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Abstract : Les télécommunications se sont banalisées au cours de ces dernières années. Poussés par l'énorme besoin du public, les systèmes d'émission et de réception sont devenus portables et les antennes se sont plus en plus miniaturisées, vue de leurs tailles réduites, l'utilisation d'antennes imprimées est devenue usuelle dans les systèmes de radiocommunications [1].

Dans le but d'améliorer les caractéristiques d'une antenne microruban rectangulaire à savoir : la perte de retour, la bande passante, la compacité et l'efficacité de ce type d'antenne, on a introduit des défections (fentes) sur le plan de masse [2], [3].

Dans cet article on présent une antenne planaire à microruban, alimentée par une ligne microruban, de dimension (8×10×1,5 mm^3), déposée sur un substrat diélectrique en alumine (ε=9,4) avec des défections rectangulaires sur le plan de masse.

Pour obtenir des bandes passantes plus larges, on introduit des fentes à deux niveaux : l'élément rayonnant et le plan de masse. Les résultats obtenus concernant les bandes passantes, diagramme de rayonnement et le gain, en utilisant le logiciel HFSS (High, Frequency,

simulateur, structural), ont été comparés avec ceux publiés, cette comparaison est très satisfaisante.

Mots clefs: Antenne microruban, fente, Bande passante, HFSS.

Réferences:

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Mecano-Stocastic Analysis of a Plate

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Abstract: The goal from our work is to explore the possibility of a tools alliance «Ansys» and «MatLab» through the Mecano-Stochastic of a square board. We will make a deterministic study that involves a Maximum Constraint of Von Mises: the assessment is made by Ansys. On the other hand, we will lead a Statistical Study from the instant of Maximal Constraint of Von Miss. We are looking for the reliability index relative to Maximal Constraint of Von Mises limits, starting from the FORM and SORM method: this assessment will be achieved by Ansys combined with Matlab.

Fusion des mesures GPS/Centrale inertielle pour la localisation d'un véhicule en milieu urbain

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Abstract: nous présentons dans ce papier les résultats de simulation d'une méthode d'aide à

la navigation routière en milieu urbain. La centrale inertielle (CI) permet un positionnement autonome du véhicule, très précis à court terme. Mais cette précision se dégrade de plus en plus au cours du temps: la vitesse de cette dérive dépend de la qualité des capteurs utilisés. Les signaux émis par les satellites de la constellation GPS permettent à tout utilisateur équipé du récepteur adéquat de se positionner n'importe où sur la surface du globe pourvu qu'il puisse recevoir quatre signaux avec une puissance suffisante. Toutefois, ils ne permettent pas d'assurer la continuité de la navigation quel que soit l'environnement. L'approche utilisée repose sur un filtre non linéaire de Kalman fusionnant d'une part les mesures GPS et d'autre part celles de la centrale inertielle. En absence du signal GPS, La continuité de la navigation est assurée par la centrale inertielle. Pour quantifier les apports de la solution proposée, cette méthode de fusion multicapteurs est appliquée à une trajectoire de simulation où la visibilité des satellites GPS est souvent faible. Mots-clés : Fusion multicapteurs, filtrage non linéaire, système de navigation inertiel, navigation par satellites.

Design of Wide-Band Substrate Integrated Waveguide Band-Pass Filters

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Abstract: Two wideband band-pass filters are presented and obtained by using two integration techniques of the substrate-integrated waveguide (SIW) with the complementary split ring resonator (CSRR) and the electromagnetic band gap (EBG) periodic structures, respectively. The first filter is designed by five-cell SIW-CSRR and the second is based on five-cell SIW-EBG. The five-cell SIW-CSRR filter has insertion losses of 0.3 dB at the midband frequency of 9.39 GHz with a fractional bandwidth of 54.31%. The five-cell SIW-EBG filter operates at 9.495 GHz with a bandwidth of 47.7% and insertion loss of 0.25 dB. The proposed filters have excellent performance in insertion loss and return loss, due to the use of Neltec NY9208 (IM).

Le séchage convectif des glandes de chêne vert d'Aurès (Quercus ilex) et L'estimation de l'énergie d'activation (Ea) et la diffusivité massique (Deff)

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Abstract: Ce travail, aborde le séchage du chêne vert (Quercus ilex) par convection naturelle. Il s'agit d'étudier les cinétiques de séchage, vitesse, coefficient de diffusivité massique et énergie d'activation des glands de chêne. Les températures étudiées sont 40, 50 et 60 C°. Le chêne a été séché sous quatre formes : glands entiers, glands pelés, demi-glands pelés et gland en poudre. Les résultats de ce travail montrent que le coefficient de diffusion des glandes de chêne varie entre 7,53—10-10 et 9,89 —10-8 (m2/s) avec l'augmentation de la température. Les valeurs de l'énergie d'activation sont respectivement 65,96, 34,17, 29,88 et 22,59 (kJ/mole) pour les glands de chênes entiers, glands pelés, demi-glands pelés et poudre. Ces résultats sont en accord avec la littérature et permettent de déterminer la forme appropriée pour le séchage des glands de chêne.

Existence results for a nonlinear unilateral Parabolic problems in Orlicz Spaces

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Abstract: In this paper we prove the existence results for a class of nonlinear unilateral parabolic problems with L1-data in Orlicz-Sobolev Spaces, without assuming any restriction on the N-function M.

Theoretical study of Donor-Bridge-Acceptor dyes used in high performance dye sensitised solar cells : Effects of the Alkyl chain the electron donor sensitisers

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ABSTRACT

Dye Sensitized Solar Cells (DSSCs) have gotten increasing attention as potential alternatives for efficient conversion of solar energy to electricity due to their low toxicity to environment, low production costs, more robust when they are used away from their ideal conditions, maximum performance when the proportion of direct light is reduced, more tolerant vis-à-vis a partial shading of panels or a bad angle of tilt to the sun and their ease of integration in the building because of the wide variety of used dyes and the possibility to adjust the transparency of the semiconductor.

One class of this novel dyes sensitizers type d-D-π-A based on carbazole as the main electron donor (D), bithiophene as π-bridge and cyanoacetic acid as the electron acceptor (A) for all studied dyes whereas the secondary electron donor (d) unit varied (thiophene, thienothiophene, carbazole, dimethoxyphenyl and andole) with different alkyls chains. The influences were investigated in isolated state and chloroforme solvent. These dyes were studied by Density Functional Theory (DFT) and Time-Dependent DFT (TD-DFT) approaches for (DSSCs). Their absorption spectra, electronic and structural properties were evaluated.

The theoretical results have shown that:

-The substitution by alkyl chain is very important in decreasing of gap energy level and red-shifted the absorption. But the increase of the alkyl chain has almost no influence on optoelectronic properties, so we must just substitute the dye with the alkyl CH_3 to facilitate calculation.

-The dye D5 with indole as a terminal electron donor moiety, can be used as a sensitizing

potential for the nanocrystalline TiO_2 solar cells in reason of their best electronic properties (Egap = 2.17 eV) and absorption properties.

Keywords: Carbazole, D-π-A structure, Photovoltaic performance, Dye sensitized solar cell

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Parallel robots display important advantages

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Abstract: Parallel robots display important advantages over their serial mechanisms in several applications where both accuracy and dynamic response are needed .Indeed; Parallel robot is fundamentally a closed-loop kinematic chain mechanism in which the end-effector is connected to the base by several independent kinematic chains. Due to the potential advantages of parallel robots such as high rigidity, high accuracy and great carrying payload capability, they have fascinated significant attention and interest amongst the researchers in the past decade. Thus, because of the strong dependence of geometric performances and their parameters, the design problems for the parallel robots are more complex and the efficacy of the design method become more difficult. In this paper, we present first, the inverse kinematic problem and Jacobian matrix of the 3RRR parallel manipulator which is necessary for subsequent analysis, then, an optimal design study is achieved for a class of parallel robots in order to find a set of parameters that attain a good performance in terms of the important performances indexes: the workspace capabilities and dexterity. Finally, simulations results are obtained.
Keywords — Inverse kinematic, Jacobian Matrix, Parallel Robot, Optimal design.

Abstract the Presentation: (required)

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conception des systèmes mécatroniques

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Dans le contexte de la conception des systèmes mécatroniques, l'analyse de la fiabilité constitue une phase indispensable dans toute étude de la sûreté de fonctionnement[1]. Elle intervient tout au long du cycle de développement du système : de la spécification jusqu'à l'intégration. De plus, la fiabilité d'un système mécatronique est conditionnée par les caractéristiques propres du système (dynamique, hybride, reconfigurable, interactif) [2], pour cela, la difficulté dans l'analyse de fiabilité d'un système mécatronique est due essentiellement à l'interaction entre les différents domaines des composants qui constituent ce système (mécanique, électronique, informatique…) [3]. Nous proposons dans cette communication une approche d'étude analytique de la fiabilité prévisionnelle, en se basant premièrement sur l'analyse qualitative (fonctionnelle/dysfonctionnelle) qui permet la description synthétique de mode de fonctionnement et l'identification des causes de défaillance pouvant affecter le bon fonctionnement d'un système [4]. Ensuite, sur l'analyse quantitative qui permet de modéliser le comportement du système durant son fonctionnement normal et d'estimer sa fiabilité [5]. L'originalité de notre approche consiste dans l'évaluation de la fiabilité des systèmes mécatronique par l'application des différentes méthodes utilisées en sûreté de fonctionnement.

Mots clés: Mécatronique, fiabilité prévisionnelle, sûreté de fonctionnement, cycle de développement, analyse qualitative, analyse quantitative, analyse fonctionnelle/dysfonctionnelle.

Blood transfusion during cardiopulmonary bypass; 1-year experience in Moroccan University Hospital.

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Abstract

Background. The development of cardiopulmonary bypass (CPB), thereby permitting open-heart surgery, is one of the most important advances in medicine in the 20th century. Since the development of CPB, hemodilutional anemia is a frequently used to reduce blood viscosity, preventing arterial hypertension. This will result in a frequent decrease of patient's hematocrits during CPB with the risks of acute anemia. Despite major advances in blood conservation strategies in reducing the requirement for red cell transfusion, transfusion rates in cardiac surgery remain high in some cardiac surgical patients for the management of life-threatening haemorrhage. The benefits of RBC transfusion include an increase in the oxygen-carrying capacity of blood, improved tissue oxygenation, and improved hemostasis. However, blood transfusion is associated with an increased risk of morbidity and mortality.

Methods. We investigated the use of blood transfusion and the impact of demographic and clinical characteristics and the interactions between the different variables in a series of 105 cardiac surgery patients undergoing CPB. Patients were divided into two groups; transfused and non-transfused.

Results. Using SPSS Statistics, the number of females was higher; women had a lower hematocrit during CPB than men, which explains why the number of females was higher in the transfused group.

Conclusion. The use of blood transfusion during CPB is restrictive. Patients with smaller body surface area and lower preoperative hematocrit may be more hemodiluted and consequently more likely transfused during CPB.

A Comparison between two Implementation Algorithms on Arduino Card for making a Decision Alert according to Rupture Threshold Merged Signal in Wireless Sensors Network.

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Abstract.: This paper describes an implementation of two algorithms for the detection of transitions in a very noisy signal resulting of wireless network sensors. The first is based on the local properties of signal stationary. It estimates the variance of the first order moment of the signal in sliding window. Considered as nonlinear filter, its output is close to zero in amplitude for stationary parts of the signal and is very high in amplitude in presence of a discontinuity. Its behavior can be compared in some way to the second algorithm result named cumulative sum or simply CUSUM. The results of a systematic comparison between both algorithms are given on an ideal and noisy signal. This algorithms are implemented in an embedded systems which is an Arduino device relating to the ratio price/quality. This work falls within the framework of a project of butane and propane gas leak detection from a company that is close to the Faculty of Science and Technique in Errachidia through the location of a set of gas and temperature (fire) sensors for warning a possible leak that may affect students, teachers and staff of the institution.

Key words: wireless network sensors, stationary, Filter, CUSUM, project, butane

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Kernel estimate and capacity in Dirichlet type spaces

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Abstract: Let μ be a positive finite measure on the unit circle. The Dirichlet type space D(μ), associated to μ, consists of holomorphic functions on the unit disc whose derivatives are square integrable when weighted against the Poisson integral of μ. First, we give an estimate of the norm of the reproducing kernel k(μ) of D(μ). Next, we study the notion of μ-capacity associated to D(μ), in the sense of Beurling-Deny. Namely, we give an estimate of μ-capacity of arcs in

terms of the norm of k(μ). We also provide a new condition on closed sets to be μ-polar. Note that in the particular case where μ is the Lebesgue measure, this condition coincides with Carleson's condition.

Convergence d'un schéma de type éléments finis pour un modèle mathématique de la spintronique

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Abstract: We propose a linear -scheme for numerical solution to a modified Landau-Lifshitz-Gilbert equation describing current-induced magnetization dynamics. We prove the convergence towards a weak solution when both time and space steps tend to zero. Numerical tests are provided to show the effect of the injected current on magnetization switching.

Performance de la commande indirecte par orientation de flux de la machine asynchrone

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Abstract: Dans cette communication, nous présentons les résultats obtenus par la méthode d'analyse basée sur la commande indirecte à flux orienté pour les moteurs asynchrones. Cette commande consiste à éliminer le problème de couplage entre l'induit et l'inducteur en dissociant le courant statorique en deux composantes, en quadrature dans un repère de référence lié au champ tournant.

L'objectif est d'appliquer deux techniques pour commander indépendamment le couple et la vitesse. Un régulateur proportionnel intégral est utilisé pour commander la vitesse du rotor de la machine asynchrone et un contrôleur de courant d'hystérésis est appliqué pour commander la tension de sortie de l'onduleur MLI.

Les résultats obtenus dans cette technique de commande ont montré l'influence des

régulateurs sur les performances du système. Les outils de mesure Simulink sont utilisés pour observer et suivre les signaux de sortie de chaque sous-bloc de la conception et ces signaux sont analysés et évalués jusqu'obtenir le bon fonctionnement. Le modèle de simulation de la commande indirecte à flux orienté montre des excellentes performances dans les deux conditions stables et transitoires. Par conséquent, les réponses de couple de la machine à induction deviennent très rapidement et avec précision.

Regulation of converter output voltage in photovoltaic applications

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Abstract: In connected photovoltaic applications, we try to provide the grid with a constant and suitable voltage. Knowing that the inverter is unable to raise the voltage to an adequate value, many applications use a boost converter to bring it up. But this converter gives a variable voltage. Thus, a high voltage makes the installation suffer from disconnection of photovoltaic inverter. In this work we added a regulation circuit to make the converter output voltage value always lowers than the maximum acceptable. So, the photovoltaic converter performance can be increased. Simulation results approve the optimal functioning of the added circuit.

Modélisation et élaboration d'un tabelau de bord pour le mesure de la performance de la chaine logistqiue hospitaliere en du regroupement des pharamcies

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Abstract: La logistique hospitalière peut avoir un impact direct sur l'optimisation des coûts et

la qualité des soins. Ce travail s'oriente vers la conception d'un outil de mesure de la performance des activités logistiques à l'hôpital dans le cas du regroupement des pharmacies .La première partie de l'article montre l'intérêt de la logistique hospitalière ainsi que la revue de la littérature concernant la modélisation et l'évaluation de la performance dans le domaine hospitalier. La deuxième partie décrit les étapes de notre méthode. Nous terminons notre travail par l'application de notre démarche à un centre hospitalier au Maroc.

L'élaboration d'algorithmes de commande adaptative multi-variable pour la conduite d'une microcentrale hydraulique

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Abstract: L'intitulé de ce travail est l'élaboration d'algorithmes de commande adaptative multi-variable pour la conduite d'une microcentrale hydraulique, qui constitue une alternative efficace pour la génération d'électricité à coût réduit. Cependant, son caractère multi variable et non linéaire, ses paramètres qui peuvent varier dans le temps et ses caractéristiques physiques (constante de temps d'éléments chauffants, acquisition-conversion de signaux) rendent sa commande advantage compliquée.

Le défi majeur de ce travail de recherche est de concevoir des lois de commandes adaptatives performantes pour une microcentrale hydraulique afin de réaliser les objectifs de poursuite des trajectoires de référence, du rejet de perturbations et de la stabilité. Pour cela j'ai commencé mon travaille sur les commandes des systèmes mono variable qui sont les correcteurs PID, le placement des pôles, et je l'ai appliqué sur Un four électrique à résistance utilisé dans l'industrie des métaux, destiné au traitement thermique d'objets est constitué d'une enceinte close chauffée par une résistance électrique alimentée par une tension v(t). Après la modélisation du système on l'a simulé sous matlab et on conclure que la méthode par

placement des poles est fiable, et simple a réalisé par contre la méthode des correcteurs PID néssecite plus de temps aussi d'un réglage permanant basant sur des méthodes expérimentales ou fréquentiels.

Existence of solution for n-dimensional Nonlinear Hyperbolic Equation with a nonlocal Conditions

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