BOOK OF ABSTRACTS

INTERNATIONAL CONFERENCE ON

MATHEMATICS APPLIED IN LIFE SCIENCES 2022

23 – 24 June 2022

IAŞI

ROMÂNIA

CONTENTS

New algorithm for monitoring network equipment using ICMP 9

Optimal Location of Aquaculture Farming: An Elimination Decision Approach 9

Global Existence and Blow up of negative-initial-energy solutions of a nonlinear hyperbolic equation 9

Codimension two and three bifurcations for a class of neutral differential systems and applications to some modelled systems 10

Numerical radius inequalities 10

Qualitative theory of solution for a higher order Klein-Gordon equation with logarithmic nonlinearity 10

Closed-Form solutions of 2-dimensional systems of difference equations 10

Linear Diophantine Fuzzy Subsets of Semigroups 11

Firefly Algorithm Based-Neural Network Control of Nonlinear Dynamical Systems with Uncertainties 11

Stochastic Processes Topics on Fractional Inequalities of the Hermite-Hadamard 12

An Existence Study for a Tripled System with $p-$ Laplacian Involving $\varphi-$ Caputo Derivatives 12

Nonlinear differential equation via $\varphi-$ Hilfer fractional derivative 13

Bandwidth consistency for various kernel estimators for functional operators in infinite dimensional. 13

A Necessary Maximum Principle of Markov Regime-Switching Forward-Backward Jump Model 13

Stability of positive 2D continuous-time Lyapunov systems 13

Global Convergence Property with Inexact Line Search for a New Hybrid Conjugate Gradient Method 14

Existence of Solutions for a Kirchhoff Type Problem with Critical Exponent in $\mathbb{R}^4$ 14

Optimal control of a phytoplankton-zooplankton spatiotemporal discrete bioeconomic model . 14

On Some Nonlocal Problems with Critical Nonlinearities 15

New Lmi Stability Test for the General Continuous Roesser Models 15

Finite-Difference Schemes for the Numerical solution of fractional Riccati differential equation with Atangana–Baleanu fractional derivative 16

Hardy-Littlewood Sobolev type theorem on the Hardy spaces for the generalized Dunkl-Riesz potential 16

Null controllability of \psi – Hilfer implicit fractional integro-differential equations with nonlocal conditions 16

Global Existence of solution for a nonlinear Timoshenko Equation with source terms 17

On Some Averaging Result for Differential Equation 17

Stability of PDEs systems: mathematical and numerical study 17

On the existence of exact periodic solution for fractional-order memristor-based circuit 17

Analysis and applications of the proportional Caputo derivative and integral in Banach space . 18

Primal-Dual Interior Algorithm for Second Order Cone Optimization Based on Kernel Function 18

Data Management and Interpretation Using Cloud Facilities in Horticultural Sciences 18

Discrete Fractional Order Two-Point Boundary Value Problem with Some Relevant Physical Applications 19

Study of instability for two interfacial waves in the presence of a basic current shear 19

Analysis of electro-elastic antiplane contact problem with friction 19

On the Solution of an Evolution Equation with mixed Finite Element 20

General decay for a viscoelastic translation Euler-Bernoulli beam 20

The impact of quarantine on the spread of addiction to electronic games among children and youth in Morocco. Fractional mathematical modeling and the optimal control approach 20

Diabetology, Machine Learning, and Causal Inference 21

A set-valued approach applied to a control problem of tuberculosis with treatment 21

Numerical Solving of Hyperbolic Partial Differential Equation 21

Mathematical modeling, analysis and optimal control of a type 1 diabetes 22

Optimal control strategy of covid-19 spread in Morocco using Seird Model 22

Existence results of viable solutions for autonomous differential inclusions with pln functions 22

A blow up of solutions for the hyperbolic type equation variable coefficients 23

About the Fuzzy Grade of a Hypergroup 23

On the positivity of a class of 2D fractional linear system described by the conformable derivative 23

On Bi-variate B-tribonacci Polynomials 23

Study of Hopf bifurcation of delayed tritrophic system: Dinoagellates, Mussels and Crabs 24

Employing Newton's method to modify the CD-conjugate gradient method for unconstrained optimization 24

Solution for Elliptic Problem with Multiple Critical Exponents 25

Existence results for quasilinear parabolic systems with nonlocal boundary 25

Existence and uniqueness of radial positive solutions to some classes of nonlinear equations involving k-Hessian operator 25

Quantum codes from Hermitian dual-containing constacyclic codes over $\boldsymbol{Fq(Fq[u]/u3=0)}$. 26

Fractional Partial Hyperbolic Differential Inclusions with finite State-Dependent Delay 26

Stability of discrete fractional-order h-Nabla neural network with noncommensurate orders 26

To Linear Differential Equations in the unit disc 27

Finite-time stabilization for fractional-order inertial neural networks with time varying delays 27

Innovating the learning experience through educational technology a digital insight 27

Linear Diophantine Multi-Fuzzy Set and its Properties 28

Nonlinear Differential Equations with different Fractional orders involving p-Laplacian Operator 28

About the numerical treatment of the quadratic eigenvalues for the Schrödinger operator 28

Existence, interval of existence of solutions for nonlinear Caputo-Hadamard fractional differential equations using the generalization of Gronwall's inequality 29

Semi-functional partial linear regression 29

Application of Shehu Decomposition method to solve Burger's Equation arising into the Irradiation of Tumour Tissue in Biological Diffusing Systems 29

Existence Result of Solution for a Nonlinear Kirchhoff Type Reaction-Diffusion Equation with Variable Exponents 30

On invariant of coadjoint orbits on Lie groups 30

Doubly Truncated Power- Hazard Rate Distribution via Generalized Order Statistics 30

Some existence results on positive periodic solution for a neutral delay hematopoiesis model .. 31

The h-stability behavior of solutions for certain nonlinear differential equations 31

Arising of Endemic Bubble in an SIR epidemic model with saturated type of treatment rate 31

Analyzing the performance of the Degree-Corrected Stochastic Block Model: from a realistic view 32

Some results for stability of Van Karman beam 32

Krasner Hyperfields and the Model Theory of Valued Fields 32

Nonparametric Estimation of Conditional Quantile Function for Functional Dependent Data ... 33

Well-posedness and asymptotic behavior of Piezoelectric Beams system with some delay terms 33

Virtual control of problems with missing data 34

Ordinal sum of triangular norms on algebraic structure 34

Existence Results for The Second Order Functional Differential Inclusions 34

A Generalization for p-Harmonic Maps 34

Estimating the Bound of a Hyperchaotic Fractional Order System and Application to Chaos Synchronization 35

Study the stability in linear neutral differential equations with variable delays by using fixed point theory 35

The existence and uniqueness for a delay population model with harvesting term 35

Multicriteria Group Decision Making Based on Intuitionistic Cubic Fuzzy Aggregation Information 36

Absolute Triple Convoluted Norlund Summable Factor 36

Calibration based Chain Ratio-Type Estimator of Population Total under Successive Sampling 36

Different estimation methods for NADARAJAH distribution 37

A Dynamic Viscoelastic Frictional Contact Problem with Normal Compliance 37

Nonparametric estimation of the conditional distribution with functional independent data 37

q-Rung Orthopair Multi-Fuzzy Soft Set 38

Nonlinear Evolution Equation of Surface-Gravity Waves in Presence of a Pycnocline of Finite Thickness 38

Elliptic problems with Robin boundary coefficient -operator conditions in Hölder spaces: non commutative cases 38

Some results for weakly strongly star Menger 39

A study on oscillatory behavior of solutions for a class of fractional differential equations with impulses 39

Hermite-Hadamard Type Inequalities for Convex Stochastic Processes via Fractional Integrals 40

Existence results for fractional problem involving the distributional Riesz derivative 40

A Review of Recent Approaches to the Variation Iterative Method for a Nonlinear Partial Differential Equation 40

Approximate Solution of Inverse Problem for Differential Equation 41

Fuzzy modeling for single server queue with double orbit and balking 41

The Adomian Decomposition Method for Solving a Class of Fractional Nonhomogeneous Multi-Pantograph Equations with Initial Conditions 41

Some characteristics of the numerical range of a bounded operator 42

Stochastic groundwater flow analysis in heterogeneous aquifer with radial basis function partition of unity method 42

The kNN smoothing of the relative-error regression with functional regressor 42

New aspects of commutativity degree in complete hypergroup theory 43

The Uniqueness Solution for p-Laplacian 43

Study of the behavior of the solutions of some systems of difference equations 43

Helix-hopes on minimal H_v-fields 43

Lie Algebras on Raised Very Thin H_v-fields 44

Solvability and dynamics of a super-linear reaction diffusion problem with integral condition .. 44

Uniqueness solution for fractional boundary value problems 44

Some results about the Mixed Convection Boundary Layer flow over a vertical permeable surface embedded in a Porous Medium 45

Investigation of Self-Similarity and Memory of Daily Data of New Confirmed Cases of COVID-19 in Some Major Impacted Countries 45

New algorithm for monitoring network equipment using ICMP

Ghouti ABDELLAOUI, Higher School in Applied Sciences, Tlemcen, Algeria,

E-mail: abdellaouighouti@gmail.com

Hafidha SEBBAGH, Higher School in Applied Sciences, Tlemcen, Algeria

Monitoring is a crucial task of network security field, it allows to control and supervise all equipment and activities within the network, for this reason we have created an algorithm that allows us to help network administrators to monitor and manage in real time and permanently the use and status of equipment, which is very useful for them to guarantee and ensure a good quality of service.
Our study aims supervision in general to be able to model a general system of supervision and which can be a platform for other related projects such as Cyber security system, network data management,

Optimal Location of Aquaculture Farming: An Elimination Decision Approach

Lazim ABDULLAH, University Malaysia Terengganu, Malaysia,

E-mail: lazim_m@umt.edu.my

Water quality is one of the most important factors that influence the location of aquaculture farming. The optimal location which is influenced by water quality for aquaculture farming development should be identified in order to produce the best quality of aquatic organisms. However, the selection of optimal locations in an aquaculture system cannot be formulated just from one criterion. Instead, the selection should consider multiple criteria of aquaculture farming and also several alternatives. This research applies Elimination and Choice Translating Reality (ELECTRE) method to deal with the uncertain criteria for selecting the optimal location of aquaculture farming. Five criteria of water parameters and four alternatives are the main hierarchical structure of the decision problem. The eight computational steps of the ELECTRE method are applied in selecting the optimal location. Three decision makers who are knowledgeable in the field of aquaculture are invited to judge the suitability of alternatives based on multiple criteria using crisp numbered linguistic terms. The results show that the alternative A4 dominates the other three alternatives which indicates that 'Marang River' is the optimal location for aquaculture farming.

Global Existence and Blow up of negative-initial-energy solutions of a nonlinear hyperbolic equation

Bounaama ABIR, University of 20 August 1955, Laboratory Lamahis, Skikda, Algeria

E-mail: abirbouna20@gmail.com

In this work, we consider the nonlinear hyperbolic equations with initial conditions. We show the local existence of theorem, then we study the global existence of solutions and we prove the blow up of solutions in the case of the energy is negative.

Codimension two and three bifurcations for a class of neutral differential systems and applications to some modelled systems

Houssem ACHOURI, Faculty of Sciences of Bizerta, Carthage University, Tunisia,

E-mail: houssemachouri93@gmail.com

We consider a neutral functional differential equation with multiple delays. In a first step, we assumed some sufficient hypotheses to guarantee the existence of the Bogdanov–Takens and the triple-zero bifurcations. In a second step, the normal form of the two bifurcations is obtained by using the reduction on the center manifold and the theory of the normal form. Finally, in a first part, we applied our study to a class of three-neuron bidirectional associative memory networks, and in a second part to a class of FitzHugh-Nagumo systems, its dynamic behaviors are studied and proved by examples and its numerical simulations under Matlab

Numerical radius inequalities

Soumia AICI, Mustapha Stambouli, Mascara, Algeria,

E-mail: soumia.aici@univ-mascara.dz

This work deals with several numerical radius inequalities for a bounded linear operator on a complex Hilbert space H. We also establish some results concerning the numerical radius for sum, product of two operators and for n×n operator matrices. Finally, we present a basic proprieties of the generalized numerical radius.

Qualitative theory of solution for a higher order Klein-Gordon equation with logarithmic nonlinearity

Ruken AKSOY, Dicle University, Turkey,

E-mail: ruken.5214@hotmail.com

Erhan PIŞKIN, Dicle University, Turkey

In this work, we consider a higher order Klein-Gordon equation with logarithmic nonlinearity. Firstly, we established the global existence of solution by potential well method. Subsequently, we obtained results of the exponential decay and blow up of solutions.

Closed-Form solutions of 2-dimensional systems of difference equations

Allam ASMA, Abdelhafid Boussouf University center of Mila, Algeria,

E-mail: a.allam@centre-univ-mila.dz

The present work deals with the solutions of two 2-dimensional nonlinear difference equations systems. The main purpose of this work is to represent the general solution of some particular cases

of two nonlinear difference equations systems in terms of Padovan, Tribonacci and generalized Pell with negative index numbers.

Linear Diophantine Fuzzy Subsets of Semigroups

Madeleine AL-TAHAN, Abu Dhabi University, Abu Dhabi, UAE,

E-mail: altahan.madeleine@gmail.com

Saba AL-KASEASBEH, Tafila Technical University, Tafila, Jordan,

Muhammad RIAZ, University of the Punjab Lahore, Pakistan,

Akin OSMAN, Ahi Evran Üniversitesi Fen-Edebiyat, Fen-Edebiyat Fakültesi Matematik Bölümü, Turkey

Linear Diophantine fuzzy set (LDFS) was recently introduced as a generalization of fuzzy set and intuitionistic fuzzy set. On the other hand, fuzzy algebraic structures were widely studied by different scholars. In this paper, we combine LDFS with algebraic structures by applying the concept of LDFS in semigroups. In this regard, we introduce some related concepts like LDF-subsemigroups, LDF-left ideals, LDF-right ideals, and LDF-ideals of semigroups. Moreover, we discuss various properties of these concepts and illustrate them by non-trivial examples. The results of this paper are considered as generalization of fuzzy substructures of semigroups.

Firefly Algorithm Based-Neural Network Control of Nonlinear Dynamical Systems with Uncertainties

Arun BALI, School of Mathematics, Shri Mata Vaishno Devi University Kakryal, Katra-182320 (JK), India,

Rahul KUMAR, School of Mathematics, Shri Mata Vaishno Devi University Kakryal, Katra-182320 (JK), India,

Uday Pratap SINGH, School of Mathematics, Shri Mata Vaishno Devi University Kakryal, Katra-182320 (JK), India,

Varun BALI, School of Physics, Shri Mata Vaishno Devi University Kakryal, Katra-182320 (JK) India,

E-mail: arunbali2017.ab@gmail.com

In this work, the problem of Firefly algorithm based neural network control for nonlinear systems with uncertainties is considered. To deal with the uncertainties present in the system, firefly algorithm based neural network controller is designed. The stability analysis of the developed controller is done by Lyapunov function method. Based on Lyapunov stability analysis, it is proven that all signals in the closed loop systems are bounded and the tracking error converges to a small neighborhood of origin. Finally, a simulation example is provided to demonstrate the effectiveness of the proposed model.

Stochastic Processes Topics on Fractional Inequalities of the Hermite-Hadamard

Mohammed BARMAKI, University Hassan II, Morocco,

E-mail: mohammed.barmaki@uit.ac.ma

In this work we apply well known fractional integral operators such as Riemann-Liouville fractional integral, k-Riemann-Liouville fractional integral, Katugampola fractional operators, conformable fractional integral, Hadamard fractional integrals, etc, on convex stochastic processes in order to establish new integral inequalities of Hermite-Hadammard type.

An Existence Study for a Tripled System with $p-$Laplacian Involving $\varphi-$Caputo Derivatives

Hamid BEDDANI, Higher School of Electrical and Energy Engineering of Oran, Algeria,

E-mail: beddanihamid@gmail.com

In this work, we present the existence and uniqueness of solutions for a tripled system of fractional differential equations with nonlocal integro multi point boundary conditions by using the $p-$Laplacian operator and the $\varphi-$Caputo derivatives. The presented results are obtained by the two fixed point theorems of Banach and Krasnoselskii. The following problem:

$$\begin{cases} \mathbf{D}_{0^+}^{\eta_m;\varphi}\psi_p\left[\mathbf{D}_{0^+}^{r_{2m};\varphi}\left(u_m(t)-\mathbf{I}_{0^+}^{\sigma;\varphi}G_m(t,u_1(t),u_2(t),u_3(t))\right)\right]=H_m(t,u_1(t),u_2(t),u_3(t)), \\ m=\overline{1,3}, \text{ and } t\in J=[0,1] \\ \psi_p\left[\mathbf{D}_{0^+}^{r_2;\varphi}\left(u_m(t)-\mathbf{I}_{0^+}^{\sigma;\varphi}G_m(t,u_2(t),u_3(t)\right)\right]\Big|_{t=0}=0, \\ u_m(0)=0,\ u_m(1)=\sum_{i=1}^{3}\lambda_{im}u_i(\zeta_{im}),\ \zeta_{im}\in[0,1] \\ \varphi(1)-\varphi(0)=K>0. \end{cases}$$

Here, we take $\mathbf{D}_{0^+}^{\eta_m;\varphi}, i,m=\overline{1,3}$ as the $\varphi-$Caputo fractional derivatives of orders r_{im}, $0\le r_{1m}<1<r_{2m}<2$, and $\mathbf{I}_{0^+}^{\sigma;\varphi}, 0<\sigma$, the fractional integral of order σ, $\lambda_{im}\in \mathrm{R}_+^*$, and $\varphi: J\to \mathrm{R}$ is an increasing function such that $\varphi'(t)\neq 0$, and $\psi_p(z)=z|z|^{p-2}$ denotes the $p-$Laplacian operator and satisfies $\frac{1}{p}+\frac{1}{q}=1, (\psi_p)^{-1}=\psi_q (q\ge 2)$. For all $t\in J$, $G_m, H_m: J\times R^3\to R$ is a given functions satisfying some assumptions that will be specified later.

Nonlinear differential equation via $\varphi-$Hilfer fractional derivative

Moustafa BEDDANI, E. N. S. of Mostaganem, Mostaganem, Algeria,

E-mail: beddani2004@yahoo.fr

In this article, we study the existence of solutions and the stability in the sense of Ulam for new nonlinear differential problem via $\varphi-$Hilfer fractional derivative. Our approach is based on Krasnoselskii's fixed point theorem. An example is given to illustrate our results.

Bandwidth consistency for various kernel estimators for functional operators in infinite dimensional.

Nadjet BELLATRACH, University Kasdi Merbah, Ouargla, Algeria,

E-mail: bellatrachnadjet@gmail.com

This paper investigates different nonparametric models such as regression, conditional distribution, conditional density, and conditional hazard function, when the covariates are infinite dimensional. The major contribution is to demonstrate uniformity in the asymptotic results of the bandwidth of the kernel estimators for these functional operators.
After that, the application issues are discussed, including data-driven bandwidth determination.

A Necessary Maximum Principle of Markov Regime-Switching Forward-Backward Jump Model

Hani BEN ABDALLAH, Mohamed Khider University, Algeria,

E-mail: hanibenabdalah@gmail.com

In this paper, we study a necessary stochastic maximum principle of Markov regime switching stochastic differential equations with jump diffusion model of mean field type under partial information.

Stability of positive 2D continuous-time Lyapunov systems

Mohammed Nadjib BENAMAR, University of Abdelhamid Ibn Badis, Mostaganem, Algeria,

E-mail: nadjib.benamar.etu@univ-mosta.dz

Mohammed Amine GHEZZAR, University of Abdelhamid Ibn Badis. Mostaganem, Algeria,

E-mail: amine.ghezzar@univ-mosta.dz

DJillali BOUAGADA, University of Abdelhamid Ibn Badis. Mostaganem, Algeria,

E-mail: djillali.bouagada@univ-mosta.dz

In this present work, we introduce a new class of positive 2D continuous-time Lyapunov systems described by the Roesser model. The positivity conditions are extended to the considered model. Necessary and sufficient conditions for the asymptotic stability of the positive 2D continuous-Time Lyapunov systems are established.

Global Convergence Property with Inexact Line Search for a New Hybrid Conjugate Gradient Method

Sabrina BEN HANACHI, Mohamed-Cherif Messaadia University - Souk Ahras, Tebessa, Algeria,

E-mail: sabrinabenhannachi9@gmail.com

Conjugate gradient (CG) method is one of the most important iterative mathematical techniques used to solve unconstrained optimization problems because of its simplicity, low memory requirements and global convergence properties. In this study, we consider a new Hybrid conjugate gradient method, which it is generated from a convex combination of Conjugate Descent proposed by Fletcher (abbreviated CD) and Al-Bayati and Al-Assady (abbreviated BA) methods, our selected method produces the sufficient descent at each iteration and global convergence property is established. Numerical results and their performances are presented to show that our new hybrid conjugate gradient method usually gives more efficient results than some of the known methods CD and BA.

Existence of Solutions for a Kirchhoff Type Problem with Critical Exponent in $\mathbb{R}^4$

Hayat BENCHIR, University of Tlemcen, Algeria,

E-mail: benchirahayet@gmail.com

This work is devoted to the existence and multiplicity to a Brezis-Nirenberg type problems involving singular nonlinearitie. The main tool is variational methods, more precisely, by using the Ekeland's variational principle we can find the first critical point with negative level. From the Mountain Pass Theorem we also obtain a critical point whose level is positive.

Optimal control of a phytoplankton-zooplankton spatiotemporal discrete bioeconomic model

Soukaina BEN RHILA, Hassan II University of Casablanca, Morocco,

E-mail: benrhila.soukaina@gmail.com

Recently, some planktonic organisms have been put to use in biotechnological applications, and their usefulness has been discovered in the development of alternative and healthy foods, natural

medicines, and cosmetics. Therefore, the management of plankton production is a major challenge for the development of aquaculture. In order to achieve this goal, chlorophyll a, a pigment present in all photosynthetic organisms, is generally and historically used as an estimator of the biomass of planktonic organisms. In this work, we propose a bioeconomic spatiotemporal discrete model in a multi-fishing zone to describe the predation interaction between phytoplankton and zooplankton (Crustacean) organisms by taking into consideration the harvesting activity. To guarantee the survival of two organisms, we consider two harvesting control strategies. The existence of optimal controls and their characterization are proved by using the discrete version of Pontryagin's maximum principle. Based on the concentration of chlorophyll a in the maritime zones of Morocco, we control and compare the biomass of the planktonic organisms in two situations (without and with control). As a major result, we found that after controlling the exploitation of planktonic organisms, their biomasses achieve a level that can ensure their sustainability. The achieved outcomes in the numerical simulations are given by using the forward-backward sweep method (FBSM).

On Some Nonlocal Problems with Critical Nonlinearities

Safia BENMANSOUR, ESM TLEMCEN, Tlemcen, Algeria,

E-mail: safiabenmansour@hotmail.fr

We study the existence of solutions for a nonlocal Kirchhoff type problem involving critical Sobolev exponent on a bounded domain in Rn; we use variational approach and the Nehari decomposition.

New Lmi Stability Test for the General Continuous Roesser Models

Kamel BENYETTOU, Abdelhamid Ibn Badis University- Mostaganem, Algeria,

E-mail: kamel.benyattou.etu@univ-mosta.dz

Djillali BOUAGADA, Abdelhamid Ibn Badis University- Mostaganem, Algeria,

Mohammed Amine GHEZZAR, Abdelhamid Ibn Badis University- Mostaganem, Algeria,

The Two-dimensional systems have attracted attention in recent years. For several decades, researchers have been studying the stability of bi-dimensional continuous systems which have many applications such as RLC circuit problems, chemical reaction, Robotics, electronics, systems engineering, signal and digital image processing. Note that this class of model propagates the state in two independent spatial directions. The aim of this work is to define new sufficient conditions for asymptotic stability tests in the context of linear matrix inequalities (LMIs). Some illustrated examples and simulations have been established to show the applicability and accuracy of the proposed approach.

Finite-Difference Schemes for the Numerical solution of fractional Riccati differential equation with Atangana–Baleanu fractional derivative

Ahmed BOKHARI, Hassiba Benbouali University, Chlef, Algeria,

E-mail: bokhari.ahmed@ymail.com

This work presents a Finite Difference scheme to solve fractional Riccati differential equation with ABC fractional derivative. In this approach, we approximate the ABC fractional derivative by a difference quotient. This technique allows to transform the given problem into a problem for solving the system of algebraic equations. Illustrative examples are included to demonstrate the validity and applicability of the proposed technique.

Hardy-Littlewood Sobolev type theorem on the Hardy spaces for the generalized Dunkl-Riesz potential

Mohamed Amine BOUBATRA, Teacher Education College of Setif, Algeria,

E-mail: m.boubatra@ens-setif.dz

In this talk, we consider the Riesz potential associated with the generalized Dunkl transform. The last one is a new investigation of the Fourier setting studied in: S. Ben Said, T. Kobayashi and B. Ørsted. Laguerre semigroup and Dunkl operators. Compos. Math., (2012), Vol (148), No 04, pp. 1265--1336. Which includes various known integral transforms. Next, we establish Hardy-Littlewood Sobolev type theorem on the Hardy spaces for the Riesz potential.

Null controllability of \psi – Hilfer implicit fractional integro-differential equations with nonlocal conditions

Ichrak Mourad BOUACID KERBOUA, LMAM, University 8 Mai 1945. Guelma, Ttamalous, Skikda, Algeria,

E-mail: ichrakbouacida@gmail.com

In this work, the null controllability of a new class of non-local \psi-Hilfer implicit fractional integro - differential equations in Hilbert space are studied. The results are obtained by using semigroup theory, \psi-Hilfer fractional calculus, Banach’s fixed-point theorem.

Global Existence of solution for a nonlinear Timoshenko Equation with source terms

Wissem BOUGHAMSA, LAMAHIS Laboratory, University of 20 August 1955, Skikda, Algeria,

E-mail: boughamsawissem2018@gmail.com

In this work, we consider a nonlinear Timoshenko equation. Under suitable assumptions with positive initial energy, we prove that the local existence is global in time.

On Some Averaging Result for Differential Equation

Amel BOURAADA, University Mustapha Stambouli, Mascara, Algeria,

E-mail: amelmaths@live.fr

The method of averaging is an important tool for analysis of nonlinear differential equations perturbed by a small parameter. It allows to replace a time-varying small perturbation, acting on along time interval, by a time-invariant perturbation, while introducing only a small error. For signi_cant results from the method of averaging with developments and example we refer.
We prove and discuss averaging results for ordinary differential equations perturbed by a small parameter. Our results generalize and extend some results in the literature.

Stability of PDEs systems: mathematical and numerical study

Hamed Abderrahmane BOURAOUI, University of Badji Mokhtar Annaba, Algeria,

E-mail: hamed-abderrahmane.bouraoui@univ-annaba.org

In this work, we study the large time behavior of a thermoelastic system with microtemperatures effects. Mathematical issues as the existence and uniqueness of solutions and the exponential stability were analyzed. The variational formulation of this problem is written as a system of coupled linear parabolic variational equations in terms of velocity, speed, microtemperatures and temperature. From the numerical point of view, the discrete approximations are introduced using the finite element method. Finally, we seek to provide numerical simulations to explain our results.

On the existence of exact periodic solution for fractional-order memristor-based circuit

Safa BOURAFA, University Center of MILA, Algeria,

E-mail: s.bourafa@centre-univ-mila.dz

Recently it has been demonstrated that the fractional-order derivative of a non-constant periodic function is not a periodic function with the same period, in [1] the authors studied quasiperiodic properties of fractional order integrals and derivatives of periodic functions. As a consequence of the

non-periodicity of the fractional derivative of a T-periodic function, the time-invariant fractional order systems do not have any non-constant exact periodic solution unless the lower terminal of the derivative is $\pm\infty$, which is not realistic. This property limits the applicability of the fractional derivative and makes it unfavorable for periodic real phenomena. In this paper, we will demonstrate that periodic solutions can be detected by imposing simple modification on the Grünwald-Letnikov, Caputo and the Riemann-Liouville definitions of fractional derivative.

Analysis and applications of the proportional Caputo derivative and integral in Banach space

Abdellatif BOUTIARA, University of Ghardaia, Medea, Algeria,

E-mail: boutiara_a@yahoo.com

In this paper, we study the Langevin equation within the generalized proportional fractional derivative. The proposed equation involves a variable coefficient and subjects to mixed integro-differential boundary conditions. We introduce the generalized proportional fractional derivative and expose some of its features. We mainly investigate the existence, uniqueness and different types of Ulam stability of the solutions via fixed point theorems and inequality techniques. Finally, we provide an example to support our main results.

Primal-Dual Interior Algorithm for Second Order Cone Optimization Based on Kernel Function

Roumaissa CHARIF, University of Batna 2, Algeria,

E-mail: r.charif@univ-batna2.dz

The main purpose of this paper is to present an interior point algorithm for second order cone optimization based on kernel function focused on the technique of central path, by using the latter and the symmetrizing scheme, called NT scaling scheme, we obtain a new search direction, furthermore the introduction of kernel function does not only measure the distance between the iterate and the central path but also ameliorate the computational complexity.

Data Management and Interpretation Using Cloud Facilities in Horticultural Sciences

Ciprian CHIRUŢĂ, Mirela COJOCARIU, Marius CĂLIN, Emilian BULGARIU, University of Life Sciences "Ion Ionescu de la Brad", Iasi, Romania,

E-mail: ebulgariu@uaiasi.ro, kyru@uaiasi.ro

Cloud applications help research teams by providing the ability to easily share experimental data, in real time, at any time of the day, on a wide variety of terminals and from locations in different areas. Data storage is done in an environment accessible to the entire team, removes the danger of data loss due to human error or equipment failure. Data is also kept safe from cyber-attacks. The data analysis

process is much faster, it can be done by several team members simultaneously and the construction of research reports can be done by combining the ideas of all members in an online discussion.

Discrete Fractional Order Two-Point Boundary Value Problem with Some Relevant Physical Applications

Omar CHOUCHA, Kasdi Merbah University of Ouargla, Ouargla, Algeria,

E-mail: choucha.omar@univ-ouargla.dz

The results reported in this paper are concerned with the existence and uniquenessof solutions of discrete fractional order two-point boundary value problem. Theresults are developed by employing the properties of Caputo and Riemann–Liouville fractional difference operators, the contraction mapping principle and the Brouwer fixed point theorem. Furthermore, the conditions for Hyers–Ulam stability and Hyers–Ulam–Rassias stability of the proposed discrete fractional boundary value problem are established. The applicability of the theoretical findings has been demonstrated with relevant practical examples. The analysis of the considered mathematical models is illustrated by figures and presented in tabular forms. The results are compared and the occurrence of overlapping/non-overlapping has been discussed Day of session:

Study of instability for two interfacial waves in the presence of a basic current shear

Dipankar CHOWDHURY, Serampore College, India,

E-mail: dipankarchowdhury05@gmail.com

Evolution equations are derived for two obliquely interacting interfacial waves in the presence of a basic current shear. Using these equations modulational instability analysis is carried outfor a pair of obliquely interacting uniform wave trains considering both unidirectional and bidirectional perturbations. It is found that the region of instability reduces in the presence of a basic current shear. Variations in the perturbed wavenumber at marginal stability due to changes in wave steepness and vorticities in the two mediums are displayed graphically. The maximum growth rate of instability for unidirectional perturbations increases with the increase in vorticity in the lower layer, but the reverse effect is observed when the vorticity in upper layer increases.

Analysis of electro-elastic antiplane contact problem with friction

Mohamed DALAH, University FMC-Constantine, Faculty of Exact Sciences, Department of Mathematics, Constantine, Algeria,

E-mail: mdalah.ufmc@yahoo.com

We study the antiplane frictional contact models for electro-elastic materials, both in quasistatic case. The material is assumed to be electro-elastic and the friction is modeled with Tresca's law and the

foundation is assumed to be electrically conductive. First we establish the existence of a unique weak solution for the model. Moreover, the Proof is based on arguments of evolutionary inequalities.

On the Solution of an Evolution Equation with mixed Finite Element

Manal DJAGHOUT, Laboratory of Applied Mathematics and Modelling, Faculty of Sciences. University 8 May 1945, Guelma. Algeria,

E-mail: djaghoutmanal@gmail.com

In this paper, we rely on the mixed finite element method to study and analyze the evolution equation, the semi discrete and the fully discrete schemes are extracted and optimal a priori error estimates are proved for both schemes. Finally, a numerical experiment is described to support our theoretical result.

General decay for a viscoelastic translation Euler-Bernoulli beam

Imane DJAIDJA, University of Science and Technology Houari Boumedienne, Algeria,

E-mail: djaidjaimane@gmail.com

In this work, we consider a cantilevered Euler-Bernoulli beam. It is fixed to a base in a translational motion at one end and to a tip mass at its free end. The beam is made of a viscoelastic material. For a large class relaxation function q, namely, $q'(t) \leq -\mu(t)H(q(t))$, where H is an increasing and convex function near the origin and is a nonincreasing function, we establish optimal explicit and general energy decay results from which we can recover the optimal exponential and polynomial decay.

The impact of quarantine on the spread of addiction to electronic games among children and youth in Morocco. Fractional mathematical modeling and the optimal control approach

Kada DRISS, Faculty of Sciences Ben M'Sik, Hassan II University, Casablanca, Morocco,

E-mail: kadadriss.2022@gmail.com

In this article, we propose a continuous-time model as a fractional order that describes the transmission dynamics of Covid-19 and the impact of the quarantine on the spread of addiction to electronic games. Also, we propose an optimal strategy through using awareness campaigns that aim at sensitizing people about the dangers of the Covid-19 disease and awareness of the dangers of electronic games through written and visual media. Also, creating rehabilitation centers for electronic games addiction. To characterize optimal controls, we use the Pontryagin's Maximum Principle and the optimally system solved by an iterative method. Finally, some numerical simulations are performed to verify the theoretical analysis using Matlab software.

Diabetology, Machine Learning, and Causal Inference

Sahar ECHAJEI, Ben M'sik Faculty of Science, Casabanca, Morocco,

E-mail: sahar.echajei-etu@etu.univh2c.ma

In artificial intelligence, in many fields of applications, statistical learning methods have demonstrated their high level of performance. One of the tasks often performed by this type of method consists in studying the statistical dependence between variables for improved classification or prediction. A considerable amount of research is also being carried out in order to evaluate the performance of machine learning methods through the angle of causality, and their use in particular in epidemiology.
The current focus on strengthening progress in measures to prevention diabetes and control the progression of its complications is mainly due to: (i) the increase in the prevalence of diabetes and, (ii) the significant improvements in clinical studies, in particular observational studies, with the increasing availability and the quality of clinical databases and the progress made in methods combining Machine Learning algorithms with causal inference.
This paper presents the results of many selected research articles that focuses on the usage of machine learning and causal inference in general healthcare and particularly in diabetology, especially: (i) predictive systems for estimation and early detection of diabetes and its complications, and, (ii) causal systems able to predict patient response to targeted therapies.
In light of the complexity of the human body structure, of its physical constraints as well as its big variability, models combining Machine Learning and causal inference thus lead to optimal decision-making, to identify new morbidity factors associated with diabetes, to customize treatment for an individual's specific needs and to anticipate and reduce the risks of diabetes complications.

A set-valued approach applied to a control problem of tuberculosis with treatment

Mohamed ELHIA, Hassan II University of Casablanca, Morocco,

E-mail: mohamed.elhia@gmail.com

The purpose of this work is to present a set-valued approach to dealing with the tuberculosis (TB) infection control problem with treatment. Our model consists of four ordinary differential equations that govern individuals who are susceptible, latent, infected, and treated. Using a Lyapunov function, the infectious TB groups are reduced to zero in the context of viability theory. The corresponding control laws are obtained via a continuous selection of an adequately designed feedback map. Finally, some numerical simulations are presented to show the efficiency of the set-valued approach.

Numerical Solving of Hyperbolic Partial Differential Equation

Khadidja FEKIRINI, Djillali-Liabes University, Sidi Bel Abbes, Algeria,

E-mail: fekirini_khadidja@yahoo.fr

This work is dedicated to the analytical resolution then numerical resolutions of hyperbolic partial differential equation. The Klein-Gordon equation is resolved analytically by the variable separation

method to get the unique exact solution that will be represented graphically. Then two numerical resolutions are proposed. The first method used is the finite difference one where a first numerical solution is calculated then represented graphically. The second numerical resolution is based on the finite element method. A comparison of these three numerical results is established at the end as a conclusion.

Mathematical modeling, analysis and optimal control of a type 1 diabetes

Hanane FERJOUCHIA, Laboratory Analysis, Modeling and Simulation LAMS.
Hassan II University of Casablanca, Morocco,

E-mail: ferjouchiahanane@gmail.com

Type 1 diabetes is a serious disease that affects many children and adolescents. The disease causes the pancreas to stop producing insulin, a hormone that regulates blood sugar level Insulin is a hormone that lowers the blood glucose concentration by catalyzing storage of glucose. In this work, the construction of a mathematical model describing the whole blood glucose-insulin system was tried. The model was derived both based upon the two minimal models of Bergman's minimal model, which is primarily used to interpret an IVGTT. Our objective is to propose a therapeutic scheme adapted to the needs of the diabetic patient and this through a mathematical model describing type 1.

Optimal control strategy of covid-19 spread in Morocco using Seird Model

Hanane FERJOUCHIA, Laboratory Analysis, Modeling and Simulation LAMS.
Hassan II University of Casablanca, Morocco,

E-mail: ferjouchiahanane@gmail.com

This work aims to predict the development of the COVID-19 pandemic in Morocco from a mathematical approach. Based on the reliability of the data and the nature of confirmed cases, the SEIRD model is employed to provide a theoretical framework to forecast COVID-19 ongoing epidemic. Findings suggest that the structure and parameters of the proposed model give insights into the dynamics of the virus.
Hence, this study contributes to the conceptual areas of knowledge on COVID-19 in proposing an optimal control plan to help decrease the number of confirmed cases by applying preventive measures such as social distancing, wearing facial masks. Matlab/ Simulink TM simulations are used to illustrate the findings.

Existence results of viable solutions for autonomous differential inclusions with pln functions

Nora FETOUCI, University of Jijel, Algeria,

E-mail: norafetou2005@yahoo.fr

We prove the existence of viable solutions for an autonomous first order differential inclusions, where the second member is a set valued mapping included in the subdifferential of a primal lower nice function.

A blow up of solutions for the hyperbolic type equation variable coefficients

Ayşe FIDAN, Dicle University, Turkey,

E-mail: afidanmat@gmail.com

In this paper, we consider the hyperbolic type wave equation with variable coefficients. Under suitable conditions on variable coefficients, we prove the blow up of solutions.

About the Fuzzy Grade of a Hypergroup

Violeta FOTEA, University Alexandru Ioan Cuza, Iasi, Romania,

E-mail: foteavioleta@gmail.com

In 2003 Corsini proved that with every hypergroupoid one canassociate a fuzzy subset, to which we can associate a join space structure. We obtain a sequence of join spaces and fuzzy sets and thefuzzy degree of the starting hypergroup is the minimum natural number forwhich the hypergroups associated to fuzzy sets are isomorphic. We analyze this number for several particular classes of hypergroups.

On the positivity of a class of 2D fractional linear system described by the conformable derivative

Mohammed Amine GHEZZAR, Mostaganem University, Algeria,

E-mail: amine.ghezzar@univ-mosta.dz

In this work, we investigate the positivity of two-dimensional fractional linear hybrid (continuous discrete-time) systems described by the Roesser model formulated on the con- formable fractional derivative calculus. A solution to these class of systems is derived. Necessary and su_cient conditions for the positivity are established. Finally, some illus- trative examples are applied to show the applicability and the accuracy of the developed method.

On Bi-variate B-tribonacci Polynomials

Dr. Suchita GOLATKAR, Dnyaprassarak Mandal's College and Research Centre, Assagao-Goa, Mapusa-Goa, India,

E-mail: suchita.golatkar@yahoo.com / suchita@dmscollege.ac.in

Fibonacci numbers pattern is found in most parts of nature. This pattern is also called the Fibonacci sequence. The Fibonacci sequence is extended in different ways. One of the ways is in terms of polynomials. In this paper, we introduce bi-variate B-tribonacci polynomials. We shall study

identities which include Binet type formula, generating function and combinatorial representation. We establish some new identities on derivatives of these polynomials.

Study of Hopf bifurcation of delayed tritrophic system: Dinoagellates, Mussels and Crabs

Mohamed HAFDANE, University Hassan 2, Casablanca, Morocco,

E-mail: med.hfdn@gmail.com

Optimal use of marine resources is conditioned by a relevant understanding of the interactions that govern them in order to ensure marine sustainability and biodiversity.
First, our study is part of the construction of a bioeconomic model through a differential three-variable delay system by modeling a food chain made of a prey, a predator and a super predator; a delay signifying the existence of toxins. Indeed, it serves to model the time required for the allocation of species by poison. Then, the work turns towards an investigation of the points of equilibrium of the system for an analysis of its stability around these points using the theory of eigenvalues. In addition, the points of bifurcation associated with delays are determined equal to the critical time in which the system loses its stability, as for our model, it is the bifurcation of Hopf whose appearance of periodic solutions. So we define the direction of this bifurcation while analyzing the stability of the solutions. Finally, numerical simulations are carried out to illustrate the theoretical results obtained.

Employing Newton's method to modify the CD-conjugate gradient method for unconstrained optimization

Naima HAMEL, University 08 May 1945 Guelma, Algeria,

E-mail: hamelnaima24@gmail.com

In this paper we are interested by Newton's and conjugate gradient methods for solving unconstrained optimization problems which can be presented as:

$$(\min)_{\top}(x\in R)\ f(x) \qquad (1)$$

Where, f: R^n→R is a smooth nonlinear function. One of the important features of the Newton method is the quadratic convergence. The CG method is very useful for solving large-scale unconstrained optimization problems.
In this work, we propose combining some nice features of the conjugate gradient method and the Newton method. To do this, we made some modifications to the conjugate descent (CD) method by making the search direction correspond to that of Newton's. The particularity of our method is that it does not need to save or compute the Hessian matrix needed by the Newton method. It has been proven that the method is globally convergent. The numerical experiments show that our modified conjugate gradient approach is more efficient than the conjugate descent (CD) method.

Solution for Elliptic Problem with Multiple Critical Exponents

Yamina HAMZAOUI, Higher School of Management, Tlemcen, Algeria,

E-mail: yamina_hamzaoui@yahoo.fr

We consider the solvability of the Neumann problem for an elliptic system of two equations with weights involving two critical Sobolev exponents on a bounded domain in ℝ^{N}. By using variational methods, we investigate the effect of the shape of the graph of the weight functions and the geometry of the boundary on the existence of solutions.

Existence results for quasilinear parabolic systems with nonlocal boundary

Matallah HANNA, University of 20 August 1955, Algeria,

E-mail: hanamaatallah5@gmail.com

This study proposes new approaches to the investigation of the work studing the Quasilinear Parabolic Equations with Nonlocal Boundary Conditions, this study is a generalization of the results, where we prove the existence of a generalized solution for a class of quasilinear equations with nonlocal boundary conditions by using Feado-Galerkin approximation.

Existence and uniqueness of radial positive solutions to some classes of nonlinear equations involving k-Hessian operator

Kods HASSINE, Laboratoire de Mathématiques, modélisation déterministe et aléatoire, université de Sousse, Monastir, Tunisia,

E-mail: hassinekods@gmail.com

The k-Hessian is the k-trace, or the kth elementary symmetric polynomial of eigenvalues of the Hessian matrix. When k ≥ 2, the k-Hessian equation is a fully nonlinear partial differential equation. We give in this work a systematic study on the existence (and non-existence) and uniqueness of radially symmetric solutions to nonlinear k-Hessian equations in the whole space R^n as well as in a ball of R^n centered at the origin.

Quantum codes from Hermitian dual-containing constacyclic codes over $F_q(F_q[u]/\langle u^3=0\rangle)$

Zineb HEBBACHE, National School of Built and Ground Works Engineering "Francis Jeanson", Garidi Kouba, 16051, Algeria,

E-mail: z.hebbache@enstp.edu.dz

Let $R = F_q + uF_q + u^2F_q$, $u^3=0$ be a finite chain ring. In this paper, we give the structure of constacyclic codes over F_qR and obtain Hermitian self-orthogonal codes over F_q by using the Gray map from F_qR^n to F_q^{4n} . As an application, we present a construction of quantum codes from the codes obtained from this class.

Fractional Partial Hyperbolic Differential Inclusions with finite State-Dependent Delay

Mohamed HELAL, Mustapha Stambouli University of Mascara, Sfisef. Sidi Bel-Abbès, Algeria,

E-mail: hellalmohamed@yahoo.fr

In this paper we investigate the existence of solutions of initial value problem for partial hyperbolic differential inclusions of fractional order involving Caputo's fractional derivative with finite state-dependent delay when the right hand side is convex valued by using a multi-valued version of nonlinear alternative of Leray-Schauder type.

Stability of discrete fractional-order h-Nabla neural network with noncommensurate orders

Amel HIOUAL, Departement of Mathematics and Computer sciences, University of Larbi Ben M'hidi, Oum El Bouaghi, Algeria,

E-mail: amel.hioual@univ-oeb.dz

The purpose of this paper is to offer a research on the stability of discrete fractional-order h-Nabla neural networks with noncommensurate orders. To address such issues, the proposed work provides numerous novel and useful criteria that may be utilized to ensure the asymptotic stability of such systems. using a novel result on the stability of nonlinear incommensurate fractional-order difference systems, we intend to propose specific results aimed at revealing the stability of the nonlinear incommensurate fractional-order discrete neural networks system constituted in the sense of the h-Nabla difference operator. The conclusions are quantitatively validated using illustrative numerical examples to demonstrate the stability of the investigated system.

To Linear Differential Equations in the unit disc

Fettouch HOUARI, University Abdelhamid Ibn Badis Mostaganem, Algeria,

E-mail: fettouch72@yahoo.fr

We study the growth of solutions to a class of linear lane. Differential equations around an isolated essential singularity point. By using conformal mapping, we apply some results from the complex plane to a neigh-boyhood of a singular point. We point out that there are several similarities between the results for complex.

Finite-time stabilization for fractional-order inertial neural networks with time varying delays

Hediene JALLOULI, University of Carthage, Tunisia,

E-mail: jalouli.hedienne@fsb.rnu.tn

This work deals with the finite time stabilization of fractional-order inertial neural network with varying time-delays. Firstly, by correctly selected variable substitution, the system is transformed into a first-order fractional differential equation. Secondly, by building Lyapunov functionalities and using analytical techniques, as well as new control algorithms (which include the delay-dependent and delay-free controller), novel and effective criteria are established to attain the finite time stabilization of the addressed system. Finally, an example is used to illustrate the effectiveness and feasibility of the obtained results.

Innovating the learning experience through educational technology a digital insight

Vishakha JOSEPH, ARKA JAIN University, India,

Rajeev Kumar SINHA, ARKA JAIN University, India,

E-mail: rajeev.s@arkajainuniversity.ac.in

Angad TIWARY, ARKA JAIN University, India

This cutting edge volume inspects creative prevents on the excursion from instructive plan to learning configuration, resembling the moving focal point of training from instructors to students. As a component of the scholastic mission to see how advancing really happens, the book recognizes innovations and cycles generally pertinent to learning plan so architects can make items designed for more significant experience. Entrancing contextual analyses represent different angles and uses of learning plan, from groundbreaking thoughts in instructional method and cooperation to planning a learning model for saving the Kiowa language. In these pages, patrons model a future for training that is student focused, universal, and comprehensive. Among the highlighted themes: • Promoting student focused guidance through the plan of logically applicable encounters. • The complex

undertaking of internet educating: the requirement for another focal point. • Mastery learning inside sped up nursing learning conditions. • Using pervasive learning methods to assemble ability in science, innovation, designing, and math: a sySTEMic methodology. • Designing valid instructive encounters through virtual assistance learning. • Instructional plan as women's activist practice. The Design of the Learning Experience will track down an intrigued crowd among teachers, training scientists, informative planners, and others staying aware of the advancement that is instructive plan.

Linear Diophantine Multi-Fuzzy Set and its Properties

Jeevitha K, Alagappa University, Karaikudi, India,

E-mail: kjeevitha991@gmail.com

Linear Diophantine Fuzzy (LDF) Set is an extension of all existing fuzzy sets. Due to the existence of reference parameters, LDF is the most flexible tool for decision makers to select their membership grades. And therefore, the essential goal of this paper is to initiate the robust fusion of Linear Diophantine MultiFuzzy Set (LDMF) as a decision-making model to find the suitable criteria for selecting appropriate model. Some of the properties of LDMF set is established.

Nonlinear Differential Equations with different Fractional orders involving p-Laplacian Operator

Mohammed KAID, University Mostaganem, 27000, Algeria,

E-mail: mohammed.kaid@univ-mosta.dz

Hamid BEDDANI, School of Electrical and Energy Engineering of Oran, 31000, Algeria

Houari FETTOUCH, Hassiba Benbouali University of Chlef, 02000, Algeria

In this paper, we initiate the study of boundary value problems involving Phi-Hilfer fractional derivatives. Some existence and uniqueness results are obtained, then another existence result is discussed via fixed point theorem. Examples illustrating our results are also presented.

About the numerical treatment of the quadratic eigenvalues for the Schrödinger operator

Soumia KAMOUCHE, University of 08 mai 1945 Guelma, Boumahra Ahmed – Guelma, Algeria,

E-mail: soumia.kamouche@gmail.com

The eigenvalues computation of the Schrödinger operators is the most important study that arises in several fields of applied mathematics. In this work, we build a new method for eigenvalues approximating of Schrödinger quadratic pencil. We propose sufficient conditions to prove the convergence of our method following both properties U and L.

Existence, interval of existence of solutions for nonlinear Caputo-Hadamard fractional differential equations using the generalization of Gronwall's inequality

Chahra KECHAR, University of Souk Ahras, Algeria,

E-mail: chahra95kechar@gmail.com

In this paper, we use the Banach fixed point theorem to obtain the existence, interval of existence and uniqueness of solutions for nonlinear hybridi mplicit Caputo-Hadamard fractional differential equations. We also use the generalization of Gronwall's inequality to show the estimate of the solutions.

Semi-functional partial linear regression

Nassima Houda KEDIR, University of Djillali Liabes, Algeria,

E-mail: nassimahoudakedir@gmail.com

This note deals to study some semi-parametric models when the data is functional. We give estimators based on different estimation techniques, in particular, the Knn method, the local linear method, modified kernel estimation, recursive estimation. The asymptotic properties of these estimators will be studied.

Application of Shehu Decomposition method to solve Burger's Equation arising into the Irradiation of Tumour Tissue in Biological Diffusing Systems

Abey KELIL, Nelson Mandela University, Gqeberha, South Africa,

E-mail: abey@aims.ac.za

Differential equations are the most significant branches of modern mathematics in modeling, and they are at the core of both pure and practical mathematics. In this paper, we employ Shehu Decomposition Method (SDM) to determine approximate-analytical solution to Burger's fundamental equation, which arises from the irradiation of tumour tissue in biological diffusing systems. The rate 'm' of consumption of oxygen per unit volume of the medium is assumed to be directly propositional to the rate of change of concentration with respect to 'x'. It is also propositional to the concentration in the moving boundary scenario. It's worth noting that a number of biochemical and medical problems, such as tumor tissue irradiation, have been revealed to be helpful for killing effectiveness of radiation on cancerous cells.

Existence Result of Solution for a Nonlinear Kirchhoff Type Reaction-Diffusion Equation with Variable Exponents

Aya KHALDI, Laboratory of Applied Mathematics and History and Didactics of Mathematics (LAMAHIS), University of 20 august 1955, Skikda, Algeria,

E-mail: ayakhaldi21@gmail.com

We consider a class of Kirchhoff type reaction-diffusion equations with variable exponents and source terms. We prove with suitable assumptions on the variable exponents r(·), m(·) the global existence of the solution and a stability result using potential and Nihari's functionals with small positive initial energy, the stability being based on Komornik's inequality.

On invariant of coadjoint orbits on Lie groups

Rafik KHALFI, Faculty of Sciences of Bizerte, University of Chartage, Tunisia,

E-mail: khalfirafik26@gmail.com

In this works, we study the conjecture of Benson and Ratcliff, which deals with the class of nilpotent Lie algebras of a one-dimensional center. We show that this conjecture is true for any nilpotent Lie algebra $\mathfrak{g}$ with $\dim\mathfrak{g}\leq 5$, but it fails for the dimensions greater or equal to 6. To this end, we produce counter-examples to the Benson–Ratcliff conjecture in all dimensions $n \geq 6$. Finally, we show that this conjecture is true for the class of three-step nilpotent Lie algebras and for some other classes of nilpotent Lie algebras.

Doubly Truncated Power- Hazard Rate Distribution via Generalized Order Statistics

Md. Izhar KHAN, Department of Mathematics, Faculty Science, Islamic University of Madinah, Madinah, Kingdom of Saudi Arabia,

E-mail: izhar.stats@gmail.com

The paper highlights the moment's characteristics of the doubly truncated power hazard rate distribution via generalized order statistics. The particular cases and several deductions are explained. The characterization result has also deliberated. Additionally, some numerical computations through R software are listed.

Some existence results on positive periodic solution for a neutral delay hematopoiesis model

Marwa KHEMIS, University of 20 August 1955, Skikda, Algeria,

E-mail: khemismarwa08@gmail.com

This work investigates a neutral delayed hematopoiesis model with iterative production term. Employing the Schauder and Banach fixed point theorems, we give some new sufficient conditions that ensure the existence of a unique positive periodic solution for the considered model. The obtained findings complement some relevant recent ones in the literature.

The h-stability behavior of solutions for certain nonlinear differential equations

Abir KICHA, University of Jijel, Algeria,

E-mail: kichaabir05@gmail.com

The question proposed in this paper is related to the study of the preservation of uniform h-stability and uniform boundedness of time-varying nonlinear differential equations with a perturbation using Gronwall's inequalities and Lyapunov's theory. Moreover, we show the linearization technique for the uniform h-stability of a nonlinear system and give necessary and sufficient conditions for the global boundedness of perturbed systems. Some examples and simulations are given to illustrate the main results.

Arising of Endemic Bubble in an SIR epidemic model with saturated type of treatment rate

Arun KUMAR, Banaras Hindu University, Varanasi, India,

E-mail: arunanuj94@gmail.com

In the current study we present complex dynamics of an SIR epidemic model that incorporates a saturated type incidence rate as well as treatment. We provide here rigorous results for asymptotic stability of equilibrium states of the proposed system. Several bifurcations including Hopf, Generalized Hopf, saddle–node, transcritical and Bogdanov–Takens are also discussed. The stability of bifurcated periodic solutions is verified with the help of first Lyapunov number. Extensive numerical simulations are performed to validate these results. In a numerical example it is observed that if the saturation factor increases slowly, then the unique endemic equilibrium state is asymptotically stable for a certain range. The further increase in the value of saturation parameter, the endemic equilibrium state loses its stability and periodic solutions appear through Hopf bifurcation. It is also observed that the increase in saturation parameter beyond Hopf bifurcation threshold, results in regaining the stability of the endemic equilibrium state, which forms an interesting dynamical phenomenon in the bifurcation diagram named as an endemic bubble. It is pointed out that in the case of two endemic equilibrium states, one of these two is always saddle,

whereas, the other one becomes unstable through Hopf bifurcation. In this scenario, the periodic solution is initially stable and it becomes unstable through generalized Hopf bifurcation. In numerical example for Bogdanov–Takens bifurcation two pairs of feasible bifurcation thresholds exist for the same set of parameters value. The bifurcation diagrams and equilibrium surfaces are also plotted to observe the combined effects of medication and saturation parameters.

Analyzing the performance of the Degree-Corrected Stochastic Block Model: from a realistic view

Zeyneb LAALA, University Center of Ahmed Salhi, Naama, Algeria,

E-mail: laalazeyneb@gmail.com

Random graphs are an important tool that represent real-data networks. They present information of the network in which they can be modeled by matrices and many of these networks can be divided into clusters based on shared characteristics or interest.
Determine emergent groups in a complex system without prior information is a challenging topic. It is frequently asked, how many communities should we break a network? Many researches was proposed to solve these problem in a network using adjacency matrix of the graph or some variants of this matrix. Some approaches request the number of communities in advance which cannot be in practice. Spectral methods in which the eigenvector's properties of the graph are used, come a point of interest because they performing well to find or estimate the number of cluster in a given network. We present in this study the performance of the spectral methods to find the number of communities under Degree-Corrected Stochastic Block Model (DCSBM) which is more realistic model and we discuss the results.

Some results for stability of Van Karman beam

Ibrahim LAKEHAL, University of Mohamed Elbachir Elibrahimi-BB, Algeria,

E-mail: ibrahimlak1991@gmail.com

In this paper we introduce and study system of the type full von Karman beam by a thermal effect and distributed delay and damping. Such that, we prove the global well−*posedness* of the system by using the semigroup theory of linear operators and we establish exponential energy decay of this system.

Krasner Hyperfields and the Model Theory of Valued Fields

Alessandro LINZI, University of Szczecin, Szczecin, Poland,

E-mail: linzi.alessandro@gmail.com

When Krasner axiomatized his hyperfields in 1957, he had in mind a specific structure which is associated to any valued field.
The model theory of valued fields has been extensively studied after 1965, when the work of Ax-Kochen and Ershov found remarkable applications in number theory.

In particular, the research on (relative) quantifier elimination (for henselian valued fields of characteristic 0) culminated in 2011 with the introduction of Flenner's RV-structures, which then have found a variety of other fruitful applications.
We argue that these structures are nothing but the hyperfields that Krasner had in mind when the hyperoperation + is encoded via the ternary relation "z belongs to x+y".

Nonparametric Estimation of Conditional Quantile Function for Functional Dependent Data

Ouahiba LITIMEIN, Djillali liabes University, Faculty of Exact Sciences, Sidi Bel Abbes, Algeria,

E-mail: ouahibalitimein@yahoo.fr

Boubaker MECHAB, Djillali liabes University, Faculty of Exact Sciences, Sidi Bel Abbes, Algeria,

E-mail: mechaboub@yahoo.fr

One of the most encountered problems in nonparametric statistics is the question of forecasting. In some situations, regression is the main tool adapted to answer this question. However, in other situations, such as the case where the conditional density is asymmetrical or multimodale, this tool is inadequate. Therefore, the conditional quantile better predicts the impact of the variable of interest Y on the explanatory variable X. The estimation of the conditional quantile is a very important subject in statistics. This estimate is used for the construction of predictive intervals, the determination of reference curves or as a forecasting tool. This study deals with nonparametric estimation of the conditional quantile based on the kernel method, in the case of response missing at random conditioned by a functional explanatory variable. Under some conditions we establish the uniform almost complete convergence (with rate) of the proposed estimator.

Well-posedness and asymptotic behavior of Piezoelectric Beams system with some delay terms

Sami LOUCIF, University of Larbi Tebessi-Tebessa, Algeria,

E-mail: conferences2022conferences@gmail.com

In this paper, our research will be related to the one-dimensional system
of piezoelectric beams with distributed delay on the mechanical equation. By using Semigroups theory, we prove that this system accepts only one solution. Next, we find the energy expression related to this system, and by using technique of Lyapunov functional we demonstrate that this system is exponentially stable, which is independent of any coefficient of the system.

Virtual control of problems with missing data

Sihem MAHOUI, University of Sciences and Technology Houari Boumediene, Algeria,

E-mail: mahoui.sihem@gmail.com

In this work we apply the virtual control to a diffusion problem with pointwise source and incomplete data. The virtual control was introduced by J-L. Lions for distributed control functions, and is based on decomposition domain methods. Due to the incomplete data we use the low-regret control approach to our problem. The virtual pointwise control is characterized by a singular optimality system.

Ordinal sum of triangular norms on algebraic structure

Abdelkrim MEHENNI, University of Science and Technology Houari-Boumediene, Algeria,

E-mail: amehenni1@usthb.dz

The ordinal sum of triangular norms on the real unit interval [0, 1] has been used to construct other triangular norms. But, in general, the standard approach to the ordinal sum construction of triangular norms and triangular conorms may not work on an arbitrary bounded lattice. In this study, we introduce a new ordinal sum construction of triangular norms and triangular conorms on an arbitrary bounded lattice. Also, we give some illustrative examples for the clarity.

Existence Results for The Second Order Functional Differential Inclusions

Imene MEDJADJ, University of Science and Technology Mohamed Boudiaf Oran USTO-MB, Algeria,

E-mail: imene.medjadj@hotmail.fr

Our aim in this work is to study the existence of solutions of the second order functional differential inclusions with finite delay. We use the Monch's fixed point theorem for the existence of solutions and the concept of measures of noncompactness.

A Generalization for p-Harmonic Maps

Bouchra MERDJI, Mustapha Stambouli University, Algeria,

E-mail: bouchramrj@gmail.com

The definitions of p-harmonic and p-biharmonic maps between Riemannian manifolds are extended in this study. Some new properties for generalized stable p-harmonic maps are presented.

Estimating the Bound of a Hyperchaotic Fractional Order System and Application to Chaos Synchronization

Souad MEROUDJ, Constantine 1 University, Algeria,

E-mail: souadmj90@hotmail.fr

The Mittag-Leffler ultimate bounds (MLUB) of fractional-order Lorenz-Stenflo hyperchaotic system (FOLSS) is investigated in this paper, using some appropriate generalized Lyapunov functions and combining fractional-order differential inequalities.
Afterwards, linear feedback control with a one, two and three inputs have been obtained to realize the synchronization of two FOLSSs by using inequality methods. Finally, numerical simulations are presented to show the effectiveness of the proposed scheme.

Study the stability in linear neutral differential equations with variable delays by using fixed point theory

Hassan MESSAOUDI, Mohamed-Cherif Messaadia University - Souk Ahras, 41000, Algeria,

E-mail: hassanmessaoudi50conf@gmail.com

In this work, we use the contraction mapping theorem to obtain asymptotic stability results about the zero solution of a linear neutral differential equation with variable delays. An asymptotic stability theorem with a necessary and sufficient condition is proved.

The existence and uniqueness for a delay population model with harvesting term

Lynda MEZGHICHE, University of 20 August 1955 Skikda, Algeria,

E-mail: linomezg3@gmail.com

Using Banach and Schauder's fixed point theorems with the Green's functions method, we establish some suitable criteria for the existence and uniqueness of periodic positive solutions for a first-order delay differential equation which models the population dynamics with harvesting term. The results of this work complement some earlier ones.

Multicriteria Group Decision Making Based on Intuitionistic Cubic Fuzzy Aggregation Information

MUNEEZA, Abdul Wali Khan University Mardan, Pakistan,

E-mail: muneeza0315@gmail.com

The information aggregation of cubic fuzzy numbers and intuitionistic fuzzy numbers have played a great role in group decision making. Therefore, the aim of this article is to develop a fuzzy decision support model for the selection of suitable company for investment by an investment corporation under the intuitionistic cubic fuzzy information. First we develop the Dombi operational laws for intuitionistic cubic fuzzy numbers under the operations of Dombi t-conorm and t-norm (DTT). Then a series of intuitionistic cubic fuzzy Dombi averaging aggregation operators are developed. Discussed their fundamental properties. We introduce a new algorithm to solve MCGDM problem and apply the proposed algorithm of MCGDM to solve the selection problem of investment company under the intuitionistic cubic fuzzy information. Moreover, TOPSIS (Technique for Order Preference by Similarity to the Ideal Solution) method has extended for intuitionistic cubic fuzzy numbers (ICFNs) and the verification of the proposed intuitionistic cubic fuzzy Dombi (ICFD) averaging operators by TOPSIS method is given. To show the supremacy of the proposed methods we have done a comparative analysis of the proposed methods with existing techniques and the results showed that the our proposed algorithm is more beneficial, adaptable and practical under uncertain conditions for suitable company selection.

Absolute Triple Convoluted Norlund Summable Factor

Alka MUNJAL, Akal University Talwandi Sabo, India,

E-mail: alkamunjal8@gmail.com

The indexed absolute triple convoluted Norlund summability $|N^3, p, q, r|_k$ factor of orthogonal series has been studied for a least set of the sufficient conditions and a set of moderated theorems have been developed. This result is very useful as absolute summability is used for Bounded Input Bounded Output (BIBO) stability of the system. By applying certain conditions on the main result, sufficient conditions for $|N, p, q|_k$ summability have been obtained (a previous result), which validates the application and importance of the present work.

Calibration based Chain Ratio-Type Estimator of Population Total under Successive Sampling

Alka NA, Banasthali Vidyapith, Tonk, India,

E-mail: singhalka2889@gmail.com

The present article proposes a chain ratio-type estimator of population total under successive sampling considering additional information on highly correlated auxiliary variable available at both the occasions. The expression for Bias and minimum MSE is derived and the condition for optimum choice of composite weights and its performance interval is given. The efficacy of the proposed

estimator is assessed through an empirical and simulation study. The studies show that the proposed estimator performs better than the other existing estimators for different choices of composite weights under various matched and unmatched sample sizes.

Different estimation methods for NADARAJAH distribution

Rochdi NOUADRI, Badji Mokhtar Annaba University, Algeria,

E-mail: rochdi.nouadri@univ-annaba.org

Nadarajah distribution is very interesting in the sense that it can be considered as a good alternative for gamma, Weibull and exponentiated exponential distributions and this distribution can have an increasing hazard rate when the probability density function is
monotonically decreasing and this fact cannot be realised for the other models. This paper deals with the estimation of Nadarajah distribution parameters by different methods. As the explicit forms of the maximum likelihood estimators (MLE)cannot be derived, we propose the use of classical methods such as method of the maximum product of spacing (MPS), method of Cramer-von-Mises (CM), method of Anderson-Darling (AD), method of Right-tail Anderson-Darling (RAD)and the method of Kolmogorov-Smirnov (K-S). An important simulation study is given to compare between the method performances and real data are used for illustration.

A Dynamic Viscoelastic Frictional Contact Problem with Normal Compliance

Imane OUAKIL, Laboratory of Pure and Applied Mathematics, University of Mohamed Boudiaf-M'sila, Algeria,

Benyattou BENABDERRAHMANE, Laboratory of Pure and Applied Mathematics, University of Mohamed Boudiaf-M'sila, Algeria,

Yamna BOUKHATEM, Laboratory of Pure and Applied Mathematics, University of Laghouat, Algeria

We consider a contact problem between a viscoelastic body and an obstacle. The constitutive law is assumed to be viscoelastic with long-term memory and the process is dynamic. The contact is modelled by a normal compliance condition and a friction law. We derive a variational formulation for the problem. Then, we prove the existence and the uniqueness of a weak solution to the model. The proof is based on the theory of nonlinear evolution equations and fixed point arguments.

Nonparametric estimation of the conditional distribution with functional independent data

Bouanani OUSSAMA, University of Abdlhamid Ibn Badis, Algeria,

E-mail: oussama.bouanani@univ-mosta.dz

In this work, we study the problem of nonparametric local linear estimation of the conditional distribution of a scalar response when a random variable takes on values in a semimetric space. The

main result of this work is the establishment of the asymptotic distribution of our estimator. A simulation study performed to evaluate finite sample behavior demonstrates the superiority of our method over the standard kernel method.

q-Rung Orthopair Multi-Fuzzy Soft Set

Mahalakshmi P, Alagappa University, Karaikudi, India,

E-mail: mahalakshmi4812@gmail.com

The q-rung orthopair fuzzy set is a generalisation of both intuitionistic and pythagorean fuzzy sets. To address the shortcomings of the q-rung orthopair fuzzy set and multi-fuzzy soft set, we investigate two new notions, namely q-rung orthopair multi-fuzzy set and q-rung orthopair multi-fuzzy soft set. The nature of the q-rung orthopair multi-fuzzy set and q-rung orthopair multi-fuzzy soft set is found to be more effective for communicating confusing and vague information. Some of their fundamental operations are defined, including complement, equality, subset, union, and intersection.

Nonlinear Evolution Equation of Surface-Gravity Waves in Presence of a Pycnocline of Finite Thickness

Anushri PURKAIT, University of Calcutta, Kolkata, India,

E-mail: anushri.p25@gmail.com

Nonlinear evolution equation, correct up to fourth order in wave steepness, is derived for surface gravity waves in the presence of a pycnocline of finite thickness in a fluid domain of infinite depth. The stability analysis is performed for a uniform-wave train solution of this evolution equation. It is found that the pycnocline has stabilizing influence and also found that thin pycnocline has more stabilizing nature than finite pycnocline. The maximum growth rate of instability increases with the increase of the thickness of the pycnocline. It is observed that the maximum growth rate of instability decreases as the density differences across the pycnocline increases and also decreases as the depth of the pycnocline increases. The maximum growth rate of instability increases as the angle between the direction of the space variation of the amplitudes and the direction of propagation of the wave decreases. Also, it is found that the unstable region increases with the decrease in the depth of the pycnocline.

Elliptic problems with Robin boundary coefficient -operator conditions in Hölder spaces: non commutative cases

Mohammed RABAH, Université Abdelhamid Ibn Badis, Algeria,

E-mail: mrabah1980@gmail.com

We prove some new results on operational second order differential equations of elliptic type with general Robin boundary conditions in a non-commutative framework. The study is developed in

Hölder spaces under some natural assumptions generalizing those in [1]. We give necessary and sufficient conditions on the data to obtain a unique strict solution satisfying the maximal regularity property, see [1]. This work completes the one given in [1]. This talk is devoted to study the following general problem

$$\begin{cases} u''(x) + Au(x) - \omega u(x) = f(x),\ x \in]0,1[\\ u'(0) - Hu(0) - \mu u(0) = d_0 \\ u(1) = u_1, \end{cases} \qquad (1)$$

with $f \in C^{\theta}([0,1]; X), 0 < \theta < 1$, where X is a complex Banach space, d_0, u_1 are given elements in X and A is a closed linear operator of domain $D(A)$ are not necessarily dense in X. H is a closed linear operator in X, ω, μ are complex parameters. Set: $A_\omega = A - \omega I$ and $H_\mu = H + \mu I$.

We will seek for a strict solution u to (1), i.e. a function u such that:

$$\begin{cases} u \in C^2([0,1]; X) \cap C([0,1]; D(A)) \\ u(0) \in D(H_\mu). \end{cases}$$

The method is essentially based on Dunford calculus, interpolation spaces, the semi-group theory and some techniques as in [1]. Our main ellipticity assumption is the following:

$[0, +\infty[\subset \rho(A)$ and $\exists C_A > 0$: $\forall \omega \geqslant 0,\ \|(A - \omega I)^{-1}\|_{\mathcal{L}(X)} \leqslant \frac{C_A}{1+\omega}$. Note that $D(A_\omega) = D(A), D(H_\mu) = D(H)$.

Here we do not assume the density of $D(A)$ in X. It is well known that $Q = -\sqrt{-A}$ and $Q_\omega = -\sqrt{-A + \omega I}$ are well defined and generate analytic semi-groups $(e^{xQ})_{x \geqslant 0}$, not necessarily strongly continuous in 0, avec $\overline{D(Q)} = \overline{D(A)}$.

Some results for weakly strongly star Menger

Lakehal RACHID, University of Boumerdes, Algeria,

E-mail: rachid.lakehal93@gmail.com

We review selected results obtained in the last fifteen years on star selection principles in topology, an important subfield of the field of selection principles theory. Motivated by the recent works of Koˇcinac who initiated investigation of star selection principles. Let X a topological space, U is a family of subset of X and A is subset of X. then the star of A with respect to U, written St(A, U), is the union of all members of U that intersect A.

In this paper:

∗ we introduce and study some new types of star-selection principles (Weakly strongly star Menger).

∗ And we give some properties of these selection principles are proved.

A study on oscillatory behavior of solutions for a class of fractional differential equations with impulses

Abdur RAHEEM, Aligarh Muslim University, India,

E-mail: araheem.iitk3239@gmail.com

The present article is concerned with the oscillatory nature of the fractional differential equation of order $\alpha \in (2,3)$ with impulsive effects. By employing a generalized Riccati transformation, we

derive several oscillation criteria of Philos type, which are either new or improve several recent results in the literature. Also, we show the stability of the considered problem. To obtain the results, we transform the fractional differential equation into second-order ordinary differential equation. In addition, we provide examples to show the effectiveness of the results.

Hermite-Hadamard Type Inequalities for Convex Stochastic Processes via Fractional Integrals

Oualid RHOLAM, School of Applied Sciences (ENSA), University Ibn Tofail, Kenitra, Morocco,

E-mail: Oualid.rholam@uit.ac.ma

Considering the fact that the concept of inequality as convexity has an important place in literature, since it provides a broader setting to study the optimization and mathematical, the goal of this work is to use different fractional integral operators on a convex stochastic process, so that some new Hermite-Hadamard type inequalities could be established.

Existence results for fractional problem involving the distributional Riesz derivative

Chaima SAADI, University of 20 August 1955 Skikda, Algeria,

E-mail: saadichaima248@gmail.com

The main goal of this paper is to study the existence results in fractional space for the fractional problem involving by distributional Riesz fractional derivative. To reach our goel, we use the application of the Schauder fixed point theory with some assumption on the nonlinear terms.

A Review of Recent Approaches to the Variation Iterative Method for a Nonlinear Partial Differential Equation

Megha SAINI, Chandigarh University, Mohali, Punjab, India,

E-mail: sainimegha48@gmail.com

This article will present the variation repetition/iterative method, a modern approach to obtain solutions for non-linear PDEs. Non–linear equations are useful in our current world. This phenomenon is useful in applied science mathematics, physics (also in theoretical physics), natural or social sciences, and engineering applications. The purpose of this phenomenon is to formulate a qualitative strategy for evaluating nonlinear differential or partial differential equations in applied mathematics, and physics, as well as to solve problems in many domains of engineering, with the help of the variation iterative transformation method and specific conditions of the Homotopy analysis techniques.

Approximate Solution of Inverse Problem for Differential Equation

Nabil SAOULI, University of Badji Mokhtar Annaba, Algeria,

E-mail: nabilsaouli48@gmail.com

This paper deals with the problem of determining an unknown source and an unknown initial condition in a abstract final value parabolic problem. This problem is ill-posed in the sense that the solutions do not depend continuously on the data. To solve the considered problem a modified Tikhonov regularization method is proposed. Using this method regularized solutions are constructed and under boundary conditions assumptions, convergence estimates between the exact solutions and their regularized approximations are obtained. Moreover, numerical results are presented to illustrate the accuracy and efficiency of the proposed method**.**

Fuzzy modeling for single server queue with double orbit and balking

Sudeep Singh SANGA, SV National Institute of Technology Surat, India,

E-mail: ssanga@amhd.svnit.ac.in

This study deals with the fuzzy modeling for the single server double orbit retrial queue with customer's balking. There are two types of customers in the system, type-I, and type-II, who are waiting for the service in their respective retrial orbits. The concept of customer balking is also incorporated in which arriving customers have the option to join the queue or not join the queue. The steady-state analysis of the model is done using a probability generating function, and further system metrics are developed using the probability distributions. Further, the double orbit model is analyzed in the fuzzy environment using Zadeh's extension principle and parametric nonlinear programming technique (P-NLP). The applicability of the single server double orbit model may be seen in many placed, including at e-commerce websites.

The Adomian Decomposition Method for Solving a Class of Fractional Nonhomogeneous Multi-Pantograph Equations with Initial Conditions

Hafidha SEBBAGH, Higher School in Applied Sciences, Algeria,

E-mail: sebbagh.hafidha@gmail.com

Ghouti ABDELLAOUI, Higher School in Applied Sciences, Algeria

Multi-pantograph equations or nonhomogeneous multi-pantograph equations have been studied analytically by many authors and by using numerical methods such as the Runge-Kutta method, the variational iteration method, the Taylor polynomials method, the discontinuous Galerkin method and the Adomian decomposition method.
In this paper, we use the Adomian decomposition method to find an approximate solution for a class of fractional nonhomogeneous multi-pantograph equations with initial conditions.

The convergence of the approach for this equation is established. We also give some examples and numerical results to illustrate our results.
The Adomian decomposition method are using in different areas such as biology, automatics, electrodynamic, ect

Some characteristics of the numerical range of a bounded operator

Ouaffa SELLAT, Tebessa University, Algeria,

E-mail: ouafasellat@gmail.com

It is well known that if the numerical range W (T) of a bounded linear operator T on a complex Hilbert space included in the real line then T* = T. In this paper, the researcher generalize this result for all line of the complex plan, exactly he determine the scalars λ and μ such that T* = λT + μI for any operator T whose numerical range is included in a determine line. He also generalize a condition for the selfadjointness of an operator.

Stochastic groundwater flow analysis in heterogeneous aquifer with radial basis function partition of unity method

Fouzia SHILE, Faculty of Sciences, University Ibn Zohr, Agadir, Morocco,

E-mail: fozishile@gmail.com

In order to protect groundwater quality, it is necessary to predict groundwater flow and solutetransport. With these needs of society and the further development of science and technology, the application of porous media has become more and more widespread, playing an increasingly prominent role, and the theory of porous media permeability has also been more profoundly studied. However, the heterogeneity and complexity of the porous media pose a major challenge to solving groundwater flow problems. In literature, finite difference, finite element, discontinuous Galerkin, spectral, and random walk methods are tested on this flow problem. The quality of the methods is assessed for increasing number of random modes and for increasing variance of the log-hydraulic conductivity fields. Despite the advances in numerical methods computing accurate flow solutions for highly heterogenous formations, they face computational challenges in terms of code efficiency and computational resources. In this communication, we present radial basis function partition of unity method to solve this problem and we look to exploit the innovative properties of this method to overcome the problems encountered when using classical numerical approaches.

The kNN smoothing of the relative-error regression with functional regressor

Guenani SOMIA, Lab. of Statistics and Process Stochastic, Univ. Djillali Liabes, Sidi Bel Abbes BP 89, Sidi Bel Abbes 22000 Algeria,

E-mail: guenanisomia@gmail.com

This study addresses the issue of nonparametric analysis using relative-error regression when the explanatory variable has infinite dimensions. We construct an estimator and establish its asymptotic

properties using the k-Nearest Neighbors method (kNN). We specifically demonstrate its Uniform consistency in Number of Neighbors (UNN) with the precision of the convergence rate. Some practical studies are also taken out to emphasize the effect of this asymptotic result in nonparametric functional statistics.

New aspects of commutativity degree in complete hypergroup theory

Andromeda SONEA, University of Life Sciences "Ion Ionescu de la Brad", Iasi, Romania,

E-mail: soneaandromeda@yahoo.com

The aim of this presentation is to introduce the commutativity degree in complete hypergroup theory. In group theory it is known there exists a relation between class equation and commutativity degree. So, we prove that in complete hypergroup theory exists a similar relation, but under certain conditions. Also, we give many examples to explain this relationship.

The Uniqueness Solution for p-Laplacian

Kamel TAHRI, Abou Bekr Belkaid University, Algeria,

E-mail: tahri_kamel@yahoo.fr

Existence- p-laplacian- Kirchhoff equation.

Study of the behavior of the solutions of some systems of difference equations

Nouressadat TOUAFEK, Mohamed Seddik Ben Yahia University, Algeria,

E-mail: ntouafek@gmail.com

A general system of difference equations of second order defined by homogeneous functions is studied with respect to stability of the equilibrium point, periodicity and oscillatory of the solutions. Our results extend and complete some existent ones in the literature. Examples that illustrate the obtained results are provided.

Helix-hopes on minimal H_v-fields

Souzana VOUGIOUKLIS, Aristotle University of Thessaloniki, Greece,

E-mail: elsouvou@gmail.com

Hyperstructure theory can overcome restrictions which ordinary algebraic structures have. A hyperproduct on non-square ordinary matrices can be defined by using the so called helix-hyperoperations. Within the frame of interdisciplinary approach, an attempt is made to apply the helix-hyperoperations, as mathematical model, used in Hyperstructure Theory, mainly in the teaching and research procedure. Specifically, when dealing with a great amount of data, it is quite difficult to teach or to transfer to another person-receiver. In such cases, the Helix Model is

suggested to be used, where every single piece of data is present and every element maintains its independence. Due to the fact that the results may be large, in this paper we use special categories, the minimal H_v-fields and special types of matrices.

Lie Algebras on Raised Very Thin H_v-fields

Thomas VOUGIOUKLIS, Emeritus Professor, Democritus University of Thrace, Xanthi, Greece,

E-mail: tvougiou@eled.duth.gr

The hyperstructures have applications in mathematics and other sciences. For this, mainly, the largest class of the hyperstructures, the H_v-structures, is used, which satisfy the weak axioms where the non-empty intersection replaces the equality and they are straightly related to fuzzy set theory. The fundamental relations connect the H_v-structures with the classical ones and they reveal new concepts as the H_v-fields. We introduce the H_v-Lie algebras based on the raised finite very thin H_v-fields.

Solvability and dynamics of a super-linear reaction diffusion problem with integral condition

Chebana ZAINOUBA, Université Larbi Ben M'hidi O.E.B, Algeria,

E-mail: chebanazainouba@yahoo.com

This work is devoted to the study of a super-linear non-local problem with an integral condition of second type for a class of parabolic equations. We show the existence of the weak solution by the method of Fadeo-Galarkin. Then, by applying a priori estimate we prove the uniqueness of the weak solution of the problem

Uniqueness solution for fractional boundary value problems

Lilia ZENKOUFI, University 8 may 1945 Guelma, Algeria,

E-mail: zenkoufi@yahoo.fr

In this work, we discuss the uniqueness results for boundary value problem of fractional differential equations. By using the Banach contraction mapping principle. As an application, an example is given to prove our results.

Some results about the Mixed Convection Boundary Layer flow over a vertical permeable surface embedded in a Porous Medium

Boudjema Djeffal KHALED, Hassiba Ben Bouali University, Chlef, Algeria

Email: k.boudjemadjeffal@univ-chlef.dz

In this work we are concerned with the solution of the third-order non-linear differential equation $f''' + ff'' + \beta f'(f' - 1) = 0$, satisfying the boundary conditions f(0) = $a \in \mathbb{R}$, $f'(0) = b < 0$ and $\lim_{t\to+\infty} f'(t) = \lambda$ where $\lambda \in \{0,1\}$ and $0 < \beta < 1$: The problem arises in the study of the opposing mixed convection approximation in a porous medium. We prove the existence, non-existence and the sign of convex and convex-concave solutions of the above problem according to the mixed convection parameter $b < 0$ and the temperature parameter $0 < \beta < 1$.

Investigation of Self-Similarity and Memory of Daily Data of New Confirmed Cases of COVID-19 in Some Major Impacted Countries

Koushik GHOSH, University Institute of Technology, The University of Burdwan, Burdwan, India

E-mail: *koushikg123@gmail.com*

In the present work investigation of self-similarity as well as scaling analysis have been performed over daily number of new confirmed cases of COVID-19 in some major impacted countries viz. USA, India, Brazil, France, Germany, UK and Russia from their respective dates of first report of COVID-19 till date. The study covers a broad span of time during which all the countries have experienced at least three waves and some of them are/were in fourth wave too. To reduce uncertainty and irregular fluctuations in these present time series seven-point moving averages are taken and the entire analysis has been further performed over these seven-point moving average data. Scale invariance and self-similarity or self-affinity manifests the fractal nature. For these time series, investigations of fractal nature have been performed by means of Higuchi method and corresponding fractal dimensions have been obtained. Also scaling analysis has been applied to understand the nature of the memory in these by means of Hurst exponent. Application of Higuchi method reveals that fractal dimensions of all the time series for all time windows are within admissible range (1, 2). So the all the time series possess self-similarity or fractal nature which possibly designates a statistical replication of patterns from micro stage to macro stage. Hurst exponent values for Brazil, France, Germany, UK and Russia in all time windows are greater than 0.5 indicating long or persistent memory which suggests essential dependence between the present and past data. The scaling analysis of USA and India gives the Hurst exponent less than 0.5 showing short or anti-persistent memory which in turn indicates an essential dependence between the present and only some near points in past. Possibly this also suggests on an average a relatively shorter incubation period for COVID-19 in USA and India. Also this magnitude in the context of India is somehow very near to 0.5 showing a tendency towards randomness and possibly this observation indicates a more uncertain behaviour in terms of predictability.

"Ion Ionescu de la Brad" Iasi University of Life Sciences (IULS)
Address: 3, Mihail Sadoveanu Alley, Iasi, 700490, Romania
Website: **www.uaiasi.ro**
Facebook Page: www.facebook.com/uaiasi