جـامعـة الحسن الثاني بالدار البيضاء
UNIVERSITÉ HASSAN II DE CASABLANCA

FSBM
FACULTE DES SCIENCES BEN M'SICK
UNIVERSITE HASSAN II DE CASABLANCA

Analysis, Modeling and Simulation LAMS
Algebra, Analysis and Applications L3A
Information Technology and Modeling LTIM
Department of Mathematics and Com. Sci.
Faculty of Sciences Ben M'sik
Hassan II University of Casablanca, Morocco

ICRAMCS 2019

ICRAMCS 2019 Proceedings ISSN : 2605-7700

1ST INTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE

MARCH 2019						
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Coordinator : Pr. Youssef EL FOUTAYENI
https://icramcs2019.sciencesconf.org/

Conference Proceedings Report

ICRAMCS 2019 Proceedings ISSN: 2605-7700

FOREWORD & ACKNOWLEDGEMENTS

The first **I**nternational **C**onference on **R**esearch in **A**pplied **M**athematics and **C**omputer **S**cience (**ICRAMCS** 2019) is aimed to bring researchers and professionals to discuss recent developments in both applied mathematics and computer science and to create a professional knowledge exchange platform between mathematicians, computer science and other disciplines. This conference is the result of international cooperation bringing together African and European universities. It is a privileged place for meetings and exchanges between young researchers and high-level African and international decision makers in the fields of mathematics and applied computing.

This conference has several major objectives, in particular:

- To bring together doctoral students and research professors in the fields of applied sciences and new technologies.
- To consolidate the scientific cooperation between the university and the socio-economic environment in the field of applied sciences.
- To allow young researchers to present and discuss their research work before a panel of specialists and university professors.
- To contribute to the development of a database, which can help decision makers to opt for a better management strategy.

The abstracts of these conference proceedings were presented at the first International Conference on Research in Applied Mathematics and Computer Science (ICRAMCS 2019), which took place in Casablanca-Morocco, from March 29 to March 30, 2019. These conference proceedings include

abstracts that underwent a rigorous review by two or more reviewers. These papers represent current important work in the field of Mathematics & Science Computer and are elaborations of the ICRAMCS conference reports.

These abstracts are provided for all presenters who have submitted abstracts and have registered as of February 01, 2019. Although every effort has been made to ensure accurate reproduction of these abstracts, the conference organizers cannot be held accountable for inaccuracies that may have occurred in their reproduction. Any changes made after February 01, 2019 to either the content of the abstracts or presentation status will not be included in these proceedings.

We wish to acknowledge the conference program committee and reviewers, for their substantial contributions and our institutions, for their support.

Sincerely,

On behalf of Organizing Committee of ICRAMCS 2019
Prof. Youssef EL FOUTAYENI
Laboratory Analysis, Modeling and Simulation LAMS
Faculty of Sciences Ben M'Sik
Hassan II University of Casablanca, Casablanca, Morocco

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UNIVERSITE HASSAN II DE CASABLANCA

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PROGRAM

Friday 03/29/19

09:00 - 09:30	**Registration**
09:30 - 10:00	**Welcome and Opening Remarks**
	Word from the Dean of the Faculty of Sciences Ben M'Sik **Word from the Director of CEDoc** **Word from the Head of Department of Mathematics & Computer Science** **Word from the director of the LAMS laboratory**

Coffee break (10:00-10:30)

	SESSION I	SESSION II	SESSION III	SESSION IV	SESSION V	SESSION VI
10:30 - 11:00	Conf. ①	Conf. ②	Conf. ③	Conf. ④	Conf. ⑤	Comm.
11:00 - 13:00	Comm.	Comm.	Comm.	Comm.	Comm.	

Lunch (13:00-15:00)

15:00 - 17:00	Comm.	Comm.	Comm.	Comm.	Comm.	Comm.

Coffee break (17:00-17:30)

17:30 - 19:00	Comm.	Comm.	Comm.	Comm.	Comm.	Comm.

Saturday 03/30/19

11:00 - 13:00	Comm.	Conf. ⑥ Comm.	Comm.	Comm.	Comm.	Comm.

Coffee break (10:30-11:00)

11:00 - 13:00	Comm.	Comm.	Comm.	Comm.	Comm.	Comm.

Lunch (13:00-15:00)

Round table (15:00-18:00)

PROGRAM OF SESSION I

Friday 03/29/19|Session I: Applied Mathematics Chairmen: Khalid ADNAOUI & Mehdi Zahid	
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10:45 11:00	Hssaine Boualam and Ahmed Roubi Proximal Bundle Methods Based on Approximate Subgradients for Solving Lagrangian Duals of Minimax Fractional Programs
11:00 - 11:15	Khouiti Bouchra and Khalid Atifi New approach to resolve an inverse problem for degenerate hyperbolic equation
11:15 - 11:30	Mohammed Abdellaoui and Elhoussine Azroul Nonlinear parabolic problem with absorption term and non-regular data
11:30 - 11:45	Nouhaila Adil and Halima Lakhbab The Multi-Compartment Vehicle Routing Problem
11:45 - 12:00	Khalid Atifi and Khouiti Bouchra An Inverse Backward Problem for Degenerate two-dimensional parabolic equation
12:00 - 12:15	Jihad Bali, Samira El Moumen and Fouzia El Wassouli Bi-objective freight transportation problem with stochastic demand
12:15 - 12:30	Mustapha Bassour Hamiltonian Polynomial Eigenvalue Problems
12:30 - 12:45	Djelloul Benzaid and Salaheddine Bentridi Review of Bethe-Weizsäcker Mass Formula Parameters
12:45 - 13:00	Zoubair Boulahia, Abderrahim Wakif and Rachid Sehaqui Two phase simulation of natural convection and entropy generation in a square cavity filled by a nanofluid with rectangular heating cylinder using the generalized Buongiorno's mathematical model
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15:00 - 15:15	Ahmed Boujnoui, Zaaloul Abdellah and Abdelkrim Haqiq Delay Optimization for the Non-cooperative Slotted ALOHA combined with ZigZag Decoding
15:15 - 15:30	Ghizlane Chaachoui and Mohammed El Khomssi New Finite Series Related To The Exponential Function
15:30 - 15:45	Mohammed El Allali and Fatima Ezzaki Convergence of Pettis Integrable Random Sets
15:45 - 16:00	Youssef El Hadfi, Mustafa Ait Khellou and Sidi Mohamed Douiri The regularizing effects of somelower order terms in a nonlinear parabolic equation
16:00 - 16:15	Mohamed El Jamali and Mohamed El Otmani Doubly reflected BSDEs driven by a Lévy process and application in finance

16:15	- 16:30	Zahra El Majouti, Rachid El Jid and Abdelkarim Hajjaj A meshless method based on the moving least squares (MLS) approximation for the numerical solution of two-dimensional linear integral equations of the second kind on non-rectangular domains
16:30	- 16:45	Hassan El Amri and Noureddine Frimane Adaptation de maillage d'un problème de perturbations singulières d'ordre deux
16:45	- 17:00	Hajar Hizazi Optimization of the lifespan of accelerators

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17:45	- 18:00	Zouhair EL Hadri, M'barek Iaousse, Mohamed Hanafi, Pasqual Dolce and Yousfi EL Kettani Properties of the Correlation Matrix Implied by a Recursive Path Model: Contribution to Path Analysis
18:00	- 18:15	Salma Lahbabi and David Gontier Numerical simulation of quantum crystals, with and without defects
18:15	- 18:30	Benali Ismail and Azzouz Awane Compatibilité des structures riemanniennes et structures k-symplectiques polarisées
18:30	- 18:45	El Amine Souhaila and Azzouz Awane Structures de Poisson polarisées
18:45	- 19:00	Laidi Zahiri, Zakaria Mighouar, Khalifa Mansouri and Mly El Houcine Ech-Chhibat Modélisation et analyse numérique de la nocivité du défaut de fatigue-corrosion dans un tube sous pression

Saturday 03/30/19|Session I: Applied Mathematics

Chairmen: Mahmoud BAROUN & El mustapha AIT BENHASSI

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08:15	- 08:30	Youssef Akdim, Mohammed Elansari and Soumia Lalaoui Rhali Existence Of A Renormalized Solution For Some Nonlinear Anisotropic Elliptic Problems
08:30	- 08:45	Khalil Namir, Ibtissam M'Rhaouarht, E. Labriji and A. Belahmer Numerical modelming of the best instantaneous decision of inventory management
08:45	- 09:00	Fatima Zahra Rahou and Nazih Abderrazzak Gadhi Necessary optimality conditions for a bilevel multiobjective programming problem via a Ψ - reformulation
09:00	- 09:15	Abderrahim Boussairi and Imane Talbaoui An upper bound for the arrow-simplicity s(T) of a tournament T

09:15	- 09:30	Ajeddar Mohamed and Lamnii Abdellah Uniform algebraic hyperbolic B-spline curves and wavelets
09:30	- 09:45	Ibrahim Lakrini Sur les Sections Harmoniques et leurs Stabilité
09:45	- 10:00	Hichem Ramoul Carleman estimate and application to an inverse coefficients problem for a strongly coupled parabolic system
10:00	- 10:15	Abdelghafour Atlas, Abderrahman Iggidr and Mohamed Oumoun Common feedback stabilization of control stochastic differential equations
10:15	- 10:30	Omar Fetitah Relative error regression under random censorship data

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11:00	- 11:15	Mohamed Laghdir, Abdelghali Ammar, Ennouri Tazi and Ahmed Rikouane Calculus rules of generalized weak approximate subdifferential for vector valued mappings and applications
11:15	- 11:30	Abdelhakim Chillali Cryptography over special ring
11:30	- 11:45	Mustapha Malek, Nouh Izem, M. Shadi Mohamed, Mohammed Seaid and Omar Laghrouche Enriched finite element solution for three-dimensional transient diffusion problems
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12:00	- 12:15	Mohamed Bilal Moustaid, Mohamed Laghdir and Issam Dali Sequential Approximate Weak Optimality Conditions for Multiobjective Fractional Programming Problems
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12:30	- 12:45	Thami Akrid, Mahmoud Baroun and Lahcen Maniar μ-Pseudo almost periodic solutions for some hyperbolic evolution equations with Stepanov pseudo almost periodic forcing terms
12:45	- 13:00	Raouf Ziadi A covering method combined with the Hook-Jeeves algorithm for continuous global optimization problems

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11:15 - 11:30	Abdelaziz Soufyane and Tijani Apalara Energy decay for a weakly nonlinear damped porous system with a nonlinear delay
11:30 - 11:45	Nabil Azouagh and Said El Melhaoui Mathematical Modeling of the Monthly Mean Temperature of Morocco using Exponential Autoregressive Processes
11:45 - 12:00	Abderrahman Ait Aadi and El Hassan Zerrik Stabilization for a class of second order semilinear systems
12:00 - 12:15	Brahim Allal, Jawad Salhi, Abdelkarim Hajjaj and Lahcen Maniar On the boundary controllabity of the one-dimensional degenerate coupled parabolic systems
12:15 - 12:30	Laila Ait Elmaalem, My Elhoussine Ech-Chhibat and Hassan Ouajji Amélioration de la Total Productive Maintenance
12:30 - 12:45	Lahoucine Ade, Lotfi Chraibi and Naoufal Sefiani Assessing Excellence in Industrial Enterprises using Structural Equation Modeling
12:45 - 13:00	Mounir Afilal, Aissa Guesmia and Abdelaziz Soufyane Energy decay rate of a linear thermoelastic Bresse system with second sound under new conditions on the coefficients of the model
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15:30 - 15:45	Jamal Eddine Benyaich, El Mustapha Ait Benhassi and Lahcen Maniar Stability of some linear systems of thermoelasticity

15:45 - 16:00	Atmane El Houch, Azzeddine Tsouli, Yassine Benslimane and Abdelbaki Attioui Output feedback stabilization of distributed bilinear time delay systems
16:00 - 16:15	Yousra Melhaoui, Khalifa Mansouri and Mostafa Rachik Toward an optimization of ship collision avoidance maneuvers approach in compliance with colreg convention
16:15 - 16:30	Abdelmajid Akil, Mourad Zegrari, Nabila Rabbah and Abdelwahed Touati Commande non linéaire de l'AGC par backstepping
16:30 - 16:45	Lahcen Ezzaki and El Hassan Zerrik Gradient stabilization of infinite dimensional bilinear systems
16:45 - 17:00	Boutayeb Hamza, Mostafa Rachik and Omar Zakary Modeling the rumors spread as an epidemic: An optimal control approach

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17:30 - 17:45	Abdelkader Kerraci, Mohamed Fayçal Khelfi and Zoubir Ahmed-Foitih Fuzzy Gain Scheduling Of Sliding Mode Control With Conditionally Integral Action For A Classes Of Nonlinear Systems
17:45 - 18:00	Sara Bidah, Omar Zakary, Mostafa Rachik, Hamza Boutayeb and Ilias Elmouki Travel-blocking vicinity optimal control approach on patches using SIRS discrete-time epidemic model
18:00 - 18:15	Dalila Bourega, Meriem Aouaouda and Hisao Fujita Yashima Oscillation de l a pluie dans un modèle mathématique de l'orage
18:15 - 18:30	Hanaa Zitane, Rachid Larhrissi and Ali Boutoulout Output stabilization for a class of semi-linear distributed systems
18:30 - 18:45	Abdeladim El Akri and Lahcen Maniar Uniform Indirect Boundary Controllability of Semi-Discrete 1-d Coupled Wave Equations
18:45 - 19:00	Rachid Bouajaji, Hassan Laarabi and Mostafa Rachik Optimal Control Therapy and Vaccination for an TB Model

Saturday 03/30/19|Session II: Dynamical systems and Control system

Chairmen: Abdelhak YAACOUBI & Youssef EL FOUTAYENI

08:00 - 08:30	**Conference n°⑥: Professor Abdelaziz SOUFYANE** **University of Sharjah/Sharjah-United Arab Emirates** ***Control and Stability of systems governed by partial differential Equations in both bounded and unbounded domain***
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08:45 09:00	Youssef Ouafik Numerical Solution of a Frictional Contact Problem in Thermo-piezoelectricity

09:00	- 09:15	Soukaina Ben Rhila, Mustafa Lhous and Mostafa Rachik A discrete mathematical modeling of dynamics of interconnected virtues
09:15	- 09:30	Hanane Ferjouchia, Soumia Elbouanani, Zineb Rachik, Mostafa Rachik and Abdelkrim Bennar The Ackermann's Method to Reduce the Sensitivity of a Discrete System with Perturbed Dynamics
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10:00	- 10:15	Zakaria Mighouar, Laidi Zahiri, Khalifa Mansouri and Zayer El Majid Modeling the effect of fluids on the integrity of pipelines subjected to dynamic loads
10:15	- 10:30	Sehail Mazid The finite horizon impulse control problem : the viscosity solution approach

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12:00	- 12:15	Maryam Riouali, Fouad Lahmidi and Abdelwahed Namir Output controllability of positive discrete linear switched systems
12:15	- 12:30	Abdelali Kamil, Khalifa Mansouri and Mostafa Rachik A study on ship automatic berthing using optimal control and artificial neural network
12:30	- 12:45	Adil Khazari and Ali Boutoulout Gradient controllability for Hyperbolics Systems : Theoretical approach
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11:00 - 11:15	Rahmoun Amel, Bedr'Eddine Ainseba and Djamila Benmerzouk An HIV within Host Model Controlled
11:15 - 11:30	Brahim Boukanjime and Mohamed El Fatini Stochastic analysis of a SIRI epidemic model with Beddington-DeAngelis incidence rate and relapse
11:30 - 11:45	Khaled Zaki and Hicham Redwane Nonlinear parabolic equations with singular function with respect to the unknown
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12:15 - 12:30	Amine El Koufi, Abdelkrim Bennar and Noura Yousfi An epidemic model with specific nonlinear incidence rate and random fluctuations
12:30 - 12:45	Adnane Boukhouima, Khalid Hattaf and Noura Yousfi Construction of Lyapunov functionals for fractional differential equations in biology
12:45 - 13:00	Sara Bidah, Mostafa Rachik and Omar Zakary La nouvelle modélisation et contrôle de la propagation spatiale des épidémies: Le modèle multi-régional SI à temps discret
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15:45 - 16:00	Khalid El Hail and Mohamed Khaladi delayed epidimic model in a periodic environment

16:00 - 16:15	Mohamed El Khalifi, Mohamed El Fatini and Regragui Taki Stochastic analysis of an epidemic model with cure, relapse and general incidence rate
16:15 - 16:30	Abdelhai Elazzouzi, Abdesslem Lamrani Alaoui, Mouhcine Tilioua and Abdessamad Tridane Dynamic Behavior and Numerical Results for an SIR Epidemic Model with Distributed Delay, Vaccination and Treatment
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Saturday 03/30/19|Session III: Biomathematics

Chairmen: Mohamed KHALADI & Jamal BOUYAGHROUMNI

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10:00 - 10:15	Nidal Echabbi and Amina Ouazzani Chahdi Courbe de direction evolute de l'indicatrice normale d'une courbe régulière
10:15 - 10:30	Abderrazzak El Haimi and Amina Ouazzani vecteur position des hélices k-obliques

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11:15 - 11:30	Bouzir Habib Almost Hermitian Golden Structures
11:30 - 11:45	Jamal Laaouine A Note on Hamming distance of linear codes over a finite chain ring
11:45 - 12:00	Abdelkader Frakis New bounds for the numerical radius of a matrix
12:00 - 12:15	Kaoutar El Bennani, El Mostafa Bachaoui and Hicham Mouncif Modeling and development a Geomatics solution for the Management of Drinking water in Urban Group Ben M'sik of Greater Casablanca using Lizmap
12:15 - 12:30	Amine Jaid The finiteness of the ring of constants problem
12:30 - 12:45	Soukaina Ouarab and Amina Ouazzani Chahdi Special Ruled Surface with Frenet Frame in Euclidean 3-Space
12:45 - 13:00	Zakaria Yaagoub, Youssef El Foutayeni and Hicham El Bouanani Introduction aux Inégalités Variationnelles

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PROGRAM OF SESSION IV

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11:15 - 11:30	Abdelkarim Boua Jordan ideals in 3-prime near-rings with left multipliers
11:30 - 11:45	Farah Balaadich and Elhoussine Azroul Existence result for a class of quasilinear elliptic systems under weak monotonicity
11:45 - 12:00	Hatim Labrigui and Samir Kabbaj Frames and Their Generalizations
12:00 - 12:15	Mohamed Amine Farid, Marhrani El Miloudi, Chaira Karim and Aamri Aamri A Fixed Point Theorems in Banach Algebra with Applications to Functional Integral Equations
12:15 - 12:30	Safae Alaoui Chrifi, Abdelaziz Tajmouati and Abdeslam El Bakkali Polynomially Riesz elements
12:30 - 12:45	Brahim Saadaoui, Samih Lazaiz and Mohamed Aamri Best Proximity Point In A locally Convex Vector Space And Application
12:45 - 13:00	Youssef Aribou, Samir Kabbaj and Jhon Rassias The Stability of N-Dimensional Quadratic Functional Inequality In Non Archimedean Banach Spaces
Lunch (13:00-15:00)	
15:00 - 15:15	Mustafa Ait Khellou, Sidi Mohamed Douiri and Youssef El Hadfi On some nonlinear parabolic equations in Musielak-Orlicz Spaces
15:15 - 15:30	Mohammed Shimi, Elhoussine Azroul and Abdelmoujib Benkirane An introduction to generalized fractional Sobolev Space with variable exponent
15:30 - 15:45	Elhoussine Azroul, Abdelmoujib Benkirane and Mohammed Srati Existence of solutions for a nonlocal Kirchhoff type problem in fractional Orlicz-Sobolev spaces
15:45 - 16:00	El Hassan Lakhel and Abdelmonaim Tlidi Controllability of impulsive semilinear stochastic partial integro-differential equations with delays

16:00 - 16:15	Athmane Boumazourh and Elhoussine Azroul The Nehari manifold for a fractional (p(),q())-Laplacian systems
16:15 - 16:30	Taoufik Sabar, Abdelhafid Bassou and Mohamed Aamri Some results on Tricyclic mappings
16:30 - 16:45	Issam Dali, Mohamed Laghdir and Mohamed Bilal Moustaid A Generalized Sequential Formula for Subdifferentials of Multi-composed Functions Defined on Banach Spaces and Applications
16:45 - 17:00	Abdeslam Touri and Samir Kabbaj On some generalizations of K-g-frames

Coffee break (17:00-17:30)

17:30 - 17:45	Said Taarabti Existence and multiplicity of the solutions of the fractional p(,)-Laplacian problem
17:45 - 18:00	Akdim Youssef, Rachid Elharch, My Cherif Hassib and Soumia Lalaoui Rhali Capacity defined in anisotropic Sobolev spaces
18:00 - 18:15	Rida Outass, Karim Chaira and El-Miloudi Marhrani Some generalized fixed point theorems in a partially ordered space endowed with two metrics
18:15 - 18:30	Nour-Eddine Elharmouchi, El Miloudi Marhrani and Karim Chaira Noncyclic mappings and best proximity pair in modular spaces
18:30 - 18:45	Idriss Ellahiani Existence de solutions faibles pour un système modélisant le transport polarisé en spin dans des multicouches ferromagnétiques
18:45 - 19:00	Kaoutar Elmoussaouy, Samia Bennani and Driss Elmoutawakil Measure of noncompactness and fixed point theory

Saturday 03/30/19|Session IV: Functional Analysis and Fixed Point Theory

Chairmen: Khalid LOUARTITI & Lahcen MANIAR

08:00 - 08:15	Abdessamad Dehaj and Mohamed Guessous Un Principe de Sous-suites dans la Théorie des Probabilités
08:15 - 08:30	Manel Belksier, Hacène Boutabia and Rania Bougherra Stochastic differential equations for eigenvalues of ε–Wishart process in the G-Framework
08:30 - 08:45	Mustapha Ait Hammou, Elhoussine Azroul and Badr Lahmi Nonlinear Elliptic Equations by Topological Degree in Musielak-Orlicz-Sobolev Spaces
08:45 - 09:00	Benkirane Abdelmoujib, El Haji Badr and El Moumni Mostafa Bounded solutions for some strongly nonlinear elliptic equations with L1-Data
09:00 - 09:15	Lakmeche Ahmed Positive solutions for a second order multi-point boundary value problem with delay
09:15 - 09:30	Hajira Dimou and Samir Kabbaj New Idea of Generalized of Variant of d'Alembert Functional Equation

09:30	- 09:45	Abdelmajid Boukhsas, Abdellah Zerouali, Omar Chakrone and Belhaj Karim Three solutions for a (p, q)-Laplacian Steklov problem
09:45	- 10:00	Youssef Mouhib and Mohamed Aamri Fixed points theorems of nonexpansive mappings and connectedness properties
10:00	- 10:15	Youssef Touail Some Generalizations of Kannan's Fixed point Theorem in Complete and Compact Metric Spaces
10:15	- 10:30	Mohamed Edraoui, Mohamed Aamri and Samih Lazaiz Fixed point theorem for p-nonexpansive mapping in locally K-convex space

Coffee break (10:30-11:00)

11:00	- 11:15	Imene Medjadj, Mouffak Benchohra and Johnny Henderson Measure of Noncompactness and Neutral Functional Differential Equations with State-Dependent Delay
11:15	- 11:30	Chaira Karim, Eladraoui Abderrahim, Kabil Mustapha and Abdessamad Kamouss Fixed point results in generalized metric spaces with a graph
11:30	- 11:45	Bougherra, Boutabia and Belksier On the Picard approximation and fixed point scheme for SDEs driven by g-Brownian motion
11:45	- 12:00	Noureddine Sabiri and Mohamed Guessous On Weak-* Césaro Convergence Almost Everywhere
12:00	- 12:15	Mohamed Bahra Construction, suivant une clause récursive, de formes géométriques ordinaires
12:15	- 12:30	Seddik Abdelalim Some Constructions of a strongly co-hopfian Abelian Groups
12:30	- 12:45	Yamna Achik, Said Benkaddour, Hicham El Bouanani and Youssef El Foutayeni Problème de Complémentarité Linéaire

Lunch (13:00-15:00)

Round table (15:00-18:00)

PROGRAM OF SESSION V

Friday 03/29/19|Session V: Applied Mathematics to Economics Chairmen: Abdelaziz EZZIANI & Naceur ACHTAICH	
10:30 - 11:00	**Conference n°⑤: Professor Sara ELOUADI** **Faculty of Economics, Law, and Social Sciences/Casablanca-Morocco** ***Analyse de l'effet de l'actionnariat salarié sur la défaillance des entreprises : une évaluation par les méthodes multicritères de scoring, cas du score Z d'Altman***
11:00 - 11:15	Ghassane Benrhmach, Abdelwahed Namir and Jamal Bouyaghroumni Estimation, evaluation and forecast: time series and neural network
11:15 - 11:30	Asmaa Idmbarek, Said Benkaddour, Hicham El Bouanani and Youssef El Foutayeni Contribution à la résolution de problèmes de complémentarité linéaire Application au Problème d'Equilibre de Nash
11:30 - 11:45	Abdellah Abnoune and El Houssine Azroul Quasi-linear elliptic equations with data in L^{1} on Riemannian manifold
11:45 - 12:00	Salah-Eddine Sahbani, Abdelilah Kaddar and Hamad Talibi Allaoui On a dynamic of a delayed EGPI model with economic characteristics of population
12:00 - 12:15	Meriem Bentounsi, Imane Agmour, Naceur Achtaich and Youssef El Foutayeni Bioeconomic model of harvesting of plankton organisms
12:15 - 12:30	Fatima Ezzahra Ben Dahou and Youssey El Foutayeni Modélisation bioéconomique, sous divers scénarios de gestion, des pêcheries à stocks plurispécifiques
12:30 - 12:45	Idrissi Fatmi Nadia Global existence for some quasilinear parabolic systems with data measures and arbitrary growth nonlinearities
12:45 - 13:00	Maria Acim, Khadija Akdim and Mehdi Zahid A Comparison between Sukuk and Bonds on the Financial Market of Malaysia

Lunch (13:00-15:00)

15:00 - 15:15	Abdelilah Kaddar Labor market: Modeling and Mathematical Analysis
15:15 - 15:30	Hamza Bouhali and Mohammed Salah Chiadmi Comparative study of the USD/MAD and EUR/USD exchange rate volatility over all periods of Moroccan foreign exchange market
15:30 - 15:45	Karima Boufi and Ahmed Roubi Duality results and dual bundle methods based on the dual method of centers for minimax fractional programs

15:45 - 16:00	Abdelali Sabri, Ahmed Jamea and Hamad Allaoui Talibi Existence of weak solutions for fractional p-Laplacian problem with Dirichlet-type boundary conditions
16:00 - 16:15	Sanaa Elfadily Hopf Bifurcation analysis of Solow model with a structured population
16:15 - 16:30	Halima Kadraoui, Abdelkrim Merbouha and Hamid Elmaroufy Bayesian Analysis of Jump diffusion Stochastic Differential Equations in Finance
16:30 - 16:45	Hajar Nafia, Naceur Achtaich, Hicham El Bouanani and Youssef El Foutayeni Problème d'Evaluation d'Options Américaines Algorithme de Lemke
16:45 - 17:00	Mohamed El Fatini and Hind Fahim Game theory and social applications : Voting games as social choice functions

Coffee break (17:00-17:30)

17:30 - 17:45	Abdeljalil Settar, Nadia Idrissi Fatmi and Mohammed Badaoui Estimation des paramètres du modèle GARCH basée sur le filtre de Kalman
17:45 - 18:00	Hanane Benaddi Accurate description for "e-service" concept:Case of Morocco
18:00 - 18:15	Youssef El Ouardi, Hicham El Bouanani and Noura Yousfi Bifurcation And Chaos In the Open Macro-economique model IS-LM
18:15 - 18:30	Mustapha El Moudden and El Arbi Abdellaoui Alaoui A new numerical method for finding the Pareto front of multi-objective optimization problems
18:30 - 18:45	Hamza Daoudi, Boubaker Mechab and Zouaoui Chikr Elmezouar Asymptotic Properties of the hazard Function with Explicatory Functional Variable for Quasi- associated Data
18:45 - 19:00	Soukaina Semami and Abdeltif Elbyed The Close Enough Traveling Salesman Problem

Saturday 03/30/19|Session V: Applied Mathematics to Economics

Chairmen: Hassan LABRIJI & Abdelwahed NAMIR

09:00 - 09:15	Boubaker Mechab and Hammou Djallal Rafik Functional local linear estimate of the conditional density with missing at random
09:15 - 09:30	Oussama Tilfani, Paulo Ferreira and My Youssef El Boukfaoui Optimal portfolios for emerging markets : An Estimation form CAPM fractal regression
09:30 - 09:45	Saida Bakht and Nadia Idrissi Fatmi Study of Class of Reaction-Diffusion System

09:45	-	10:00	Mohamed El Harami Pettis conditional expectation of closed convex random sets in a Banach space without RNP

Coffee break (10:30-11:00)

11:00	-	11:15	Mohammed Razzok, Abdelmajid Badri, Yassine Ruichek and Aïcha Sahel Street crossing pedestrian detection system
11:15	-	11:30	Imane Sadgali, Nawal Sael and Faouzia Benabbou Novel adaptive model for detection of credit card fraud
11:30	-	11:45	Badr Elkari, Loubna Ourabah and El Houssine Labriji A New Odometric Localization For unicycle Vehicle: FPGA implementation using VHDL code
11:45	-	12:00	Loubna Ourabah, Badr Elkari and El Houssine Labriji Multi-criteria Approach for Optimizing Road Traffic based on Fuzzy Logic and Graph Theory
12:00	-	12:15	Loubna Ourabah, Badr Elkari and El Houssine Labriji A New Approach For Dynamic Traffic Lights Management Based On Fuzzy Logic Theory
12:15	-	12:30	Rajae Zriaa and Said Amali Optimisation du processus de recommandation pour un nouveau apprenant de MOOC "Cold start Learner"
12:30	-	12:45	Meriem Bouhlal, Kawtar Aarika, El Habib Ben Lahmar and Sanaa El Filali Etude sur la reconnaissance automatique des expressions du visage en utilisant l'apprentissage profond

Lunch (13:00-15:00)

Round table (15:00-18:00)

PROGRAM OF SESSION VI

Friday 03/29/19|Session VI: Computer Science Chairmen: Khalifa MANSOURI & Abdelwahed NAMIR	
10:30 - 10:45	Hicham Gourram, Mostafa Rachik and Hassan Labriji La modélisation de système intelligent des réseaux routiers orientés graphiques
10:45 - 11:00	Said Amali and Ali Boutoulout Régression linéaire multiple et programmation dynamique pour optimiser les stations de rechloration d'eau potable
11:00 - 11:15	Fatima Zahra Fagroud, El Habib Ben Lahmar, Sanaa El Filali and Hicham Toumi Internet des objets : Challenges, Caractéristiques et Applications
11:15 - 11:30	Ilias Cherkaoui and Fouad Zinoun On the Egyptian Product-Based Encryption
11:30 - 11:45	Adib Jihad, Marzak Abdelaziz and Moutachaouik Hicham Vers un système informatisé d'orientation de l'étudiant Marocain
11:45 - 12:00	Zineb Nassr, Nawal Sael and Faouzia Benabbou Sentiment analysis In Social networks: State of art
12:00 - 12:15	Islam Toulali and Lahbib Zenkouar Nouvelle architecture de filtre passe-bande pour les applications large bande
12:15 - 12:30	Touria Hamim, Nawal Sael and Faouzia Benabbou Student Profile Analysis using Machine Learning: State of Art
12:30 - 12:45	Mahjoubi Khadija, Labriji Hassan and El Achrak Ibtissam Modèle de Sélection des services web à base de QOS
12:45 - 13:00	Nadia Bouhriz, Faouzia Benabbou and El Habib Benlahmar Arabic Word Semantic similarity: a survey
Lunch (13:00-15:00)	
15:00 - 15:15	Khadija Alaoui RDF management systems: evaluation criteria and comparison
15:15 - 15:30	Zhor Ismaili, Nour-Eddine El Faddouli, Said Amali and Ali Boutoulout Modèle prédictif de la qualité de l'eau à base de Séries temporelles
15:30 - 15:45	Mohammed Aitdaoud, Khalil Namir, Soufiane Bouiti, Brahim Nachit and Mohammed Talbi Performance prediction of Moroccan high school students
15:45 - 16:00	Sara Baali, Abdelaziz Kriouile and Samia Soumia Ezzahid Analytical text for social networks

16:00 - 16:15	Lamyae Bennis, Said Amali and Ali Boutoulout Profiling Activity: Studying Learning Style for Generating an Adaptive Learning Game
16:15 - 16:30	Kawtar Najmani, Nawal Sael, Ahmed Zellou and El Habib Benlahmar Collaborative filtering approach in recommender systems: Study and Analysis
16:30 - 16:45	Abdelilah Adiba, Hajji Hicham and Mustapha Maatouk Transfer learning and Deep Encoder-Decoder architecture for buildings segmentation
16:45 - 17:00	Ibtissam Elachkar and El Houssine Labriji Development of an Algorithm for Enriching the User Profile from his Social Network

Coffee break (17:00-17:30)

17:30 - 17:45	Ferouani Abdel Karim, Liani Bachir, Ailas Ismail and Guaaybess Youcef Thermodynamique properties of CH4 thermal plasmas mixed with H2
17:45 - 18:00	Hajar Haddani, Abdelmajid El Moutaouakkil and Fatiha Benzekri The medical image segmentation using watershed transform include merging region
18:00 - 18:15	Badr Elkari, Loubna Ourabah and El Houssine Labriji Fusion of Multiple Behaviors using Fuzzy Logic: Application for an Autonomous Vehicle in an Uncertain Environment
18:15 - 18:30	Sakina Elhadi, Abdelaziz Marzak and Sael Nawal Personalized model of good use of IoT protocols
18:30 - 18:45	Abdessamad Cherkaoui, Soukaina Merzouk, Abdelaziz Marzak and Mustapha Hain Systèmes d'Exploitation utilisé pour l'internet des objets : Étude Comparative
18:45 - 19:00	Ibtissam M'Rhaouarh, Abdelwahed Namir and Nadia Chafiq opportunities of Machine learning in cloud computing opportunities

Saturday 03/30/19|Session VI: Computer Science

Chairmen: Mohamed AZZOUAZI & Khalifa MANSOURI

08:00 - 08:15	Fouad Nafis, Yahyaouy Ali and Aghoutane Badraddine Publishing arabic manuscript documents as Linked Data
08:15 - 08:30	Mohammed Benalla, Boujemâa Achchab and Hamid Hrimech On the computational efficiency of Dempster's rule of combination
08:30 - 08:45	Mohssine Bentaib, Mohamed Aitdaoud and Mohammed Talbi Implementation of a computer device to improve the quality of life of students
08:45 - 09:00	Mohamed Housni, Abdlwahed Namir, Mohammed Talbi and Nadia Chafiq Locate Learning analytics in context: Embracing Big Data in Educational reforms in Morocco
09:00 - 09:15	Mohamed Oumansour, Abdelhakim Ballouk, Abdennaceur Baghdad and Abdelaziz Mouhou Boundary and Pointwise Control actuation of one-dimensional heat equation process via the Takagi-Sugeno Fuzzy PDE Model

09:15	- 09:30	Yassir Aadil, Mohamed Sillare and Hind Ouzif Une approche de mesure de similarité pour l'évaluation de la pertinence en recherche d'informations
09:30	- 09:45	Soumia Elbouanani Deduction's Method Implementation to Verify the SystemC Designs
09:45	- 10:00	Hammou Djalal Rafik and Mechab Boubaker Optimization of iris segmentation by analysis the Integro-Differential Operator algorithm and the Hough transform
10:00	- 10:15	Rachida Ihya A Prediction Model for a Targeted E-orientation academic and professional
10:15	- 10:30	Soukaina Merzouk, Abdessamad Cherkaoui, Abdelaziz Marzak and Nawal Sazl Méta-Modèle pour les Méthodes Agiles

Coffee break (10:30-11:00)

11:00	- 11:15	Chaimae Boulahia, Hicham Behja and Mohammed Reda Chbihi Louhdi Etat de l'art : ETL Sémantique pour Big Data
11:15	- 11:30	Nouhaila Idrissi, Ahmed Zellou, Oumaima Hourrane, Zohra Bakkoury and El Habib Benlahmar A New Hybrid Approach for Alleviating Cold-Start Issues in Recommender Systems
11:30	- 11:45	Abdelfettah Soultana, Faouzia Benabbou and Nawal Sael Advanced Driver Assistance System: Study and Analysis
11:45	- 12:00	Zouhair Chiba, Noreddine Abghour, Khalid Moussaid, Amina El Omri and Mohamed Rida A Performed Intrusion Detection System for Cloud Environment Based on Deep Learning and Self-Adaptive Heuristic Search Algorithm with Optimization Strategies
12:00	- 12:15	Sara Chillali and Lahcen Oughdir New approach of encryption using images
12:15	- 12:30	Ouldzira Hicham, Mouhsen Ahmed and Hassoun Mohamed The use of NodeMcu to detect an object inside a remote monitoring field
12:30	- 12:45	Rachida Ait Abdelouahid, Abdelaziz Marzak and Nawal Sael Generic Interoperability Architecture for Internet of Things
12:45	- 13:00	Mounia Miyara, Mohcine Boudhane, Hamza Toulni and Benayad Nsiri Perceptual-Cognitive training on Subjective Student Performance Prediction for Graduate Students Orientation

Lunch (13:00-15:00)

Round table (15:00-18:00)

ICRAMCS 2019

ABSTRACTS

SESSION I : APPLIED MATHEMATICS

Numerical analysis of a frictional electro-elastic contact problem with normal compliance

EL Hassan BENKHIRA[1], **Rachid FAKHAR**[2], **Youssef MANDYLY**[2]

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[2] Laboratory LS3M, University Sultan Moulay Slimane, Khouribga, Morocco

Abstract

In this paper, we study a class of static problems involving a frictional normal compliance contact model for electro-elastic materials with an electrically conductive foundation. The variational formulation of the problem leads to a general system coupling a quasi-variational inequality for the displacement field and a variational equation for the electric field. We establish an existence and uniqueness result of the solution. Then, we provide a numerical scheme of approximation, and we prove its convergence. Finally, we present numerical simulations in the study of a two-dimensional test example.

Key words: Piezoelectric body, Linear elastic material, Normal compliance contact condition, Coulomb's friction law, Iteration method.

Mathematics Subject Classification MSC2010: 74B05, 35J87, 47J25, 74S05, 65N55, 37M05.

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Proximal Bundle Methods Based on Approximate Subgradients for Solving Lagrangian Duals of Minimax Fractional Programs

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Abstract

We are interested in this work to solve the Lagrangian dual of a generalized fractional program (GFP), which gives the minimal value of the primal problem, thanks to some duality results. With the help of a general minimax equality assumption, we give duality results under minimal assumptions. Since the associate parametric programs of the dual of GFP, are always concave, we use a general approximating proximal scheme to these subproblems, and construct bundle methods by means of approximate values and approximate subgradients of the dual parametric function. As for all dual algorithms, the proposed methods generate a sequence of values that converges from below to the minimal value of GFP, and a sequence of approximate solutions that converges to a solution of the Lagrangian dual of GFP. For certain classes of problems, the convergence is at least linear.

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New approach to resolve an inverse problem for degenerate hyperbolic equation

Bouchra KHOUITI[1], Khalid ATIFI[1], E-H. Essoufi[1]
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Abstract
This paper deals with the determination of an initial condition in degenerate hyperbolic equation from final observations. With the aim of reducing the execution time, this inverse problem is solved using an approach based on double regularization: a Tikhonov's regularization and regularization in equation by viscose-elasticity. So, we obtain a sequence of weak solutions of degenerate linear viscose-elastic problems. Firstly, we prove the existence and uniqueness of each term of this sequence. Secondly, we prove the convergence of this sequence to the weak solution of the initial problem. Also we present some numerical experiments to show the performance of this approach.

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Nonlinear parabolic problem with absorption term and non-regular data

Mohammed ABDELLAOUI[1], Elhoussine AZROUL[2]
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Abstract

We study existence of solutions to a nonlinear parabolic boundary value problem with a general absorption term and a measure as non-regular datum, of the form

$$\begin{cases} b(u)_t - \Delta_p u + h(u) = \mu \quad in \quad \Omega \times (0,T), \\ \qquad u = 0 \quad on \quad \partial\Omega \times (0,T), \\ \qquad b(u) = b(u_0) \quad in \quad \Omega \times \{0\}, \end{cases} \tag{1.1}$$

where Ω is an open bounded subset of $\mathbb{R}^N$ $(N \geq 2)$, $b: \mathbb{R} \to \mathbb{R}$ is a C^1 −increasing function, $b(u_0)$ is an integrable function, Δ_p is the $p-$ laplace operator, μ is a bounded Radon measure on $\Omega \times (0,T)$ and h is a continuous function such that $h(s)s \geq 0$. Futhermore, we show uniqueness of solutions in presence of a non-increasing h.

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The Multi-Compartment Vehicle Routing Problem

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Abstract

The multi-compartment vehicle routing problem MCVRP, is one of the fundamental problems in operational research and physical distribution, that was widely studied in the last decades. Nevertheless, the multi-depot variant of the problem has been neglected or barely considered in the researches; despite its importance in the real case problems especially the ones encountered in fuel distribution industry.
To the best of our knowledge, it was first studied in 2012 by Cornillier and al. [1], and a heuristic was developed to solve the problem. Then in 2017, Alinaghian and Shokouhi [2] proposed a new mathematical model, and solved it by a hybrid algorithm of adaptative large neighborhood search and variable neighborhood search. In this communication we will represent an extended mathematical model of this multi-depot variant, assuming we have a heterogeneous fleet and maybe accessibility restriction.

References

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An inverse backward problem for degenerate two-dimensional parabolic equation

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Abstract
This paper deals with the determination of an initial condition in degenerate two-dimensional parabolic equation from final observations. This inverse problem can be considered as a problem of minimizing of a cost function J. To solve it, firstly, we give a new theorem which gives the existence and uniqueness of the weak solution of the direct problem. Secondly, to show that the minimization problem and the direct problem are well-posed, we prove that the solution's behavior changes continuously with the initial conditions. Thirdly, we prove the differentiability of the functional J, which gives the existence of the gradient of J, that is computed using the adjoint state method. Finally, to show the convergence of the descent method, we prove that the gradient of J is Lipschitz continuous. Also we present some numerical experiments to show the performance and stability of the proposed approach.

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Bi-objective freight transportation problem with stochastic demand

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Abstract

The number of planet residents is increasing as well as their needs. Therefore, the freight movement maintains its position as one of the most vital sectors. Besides, people nowadays are more exigent on-time delivery, which is forcing firms to ship their goods using different types of transportation to keep up with just-in-time systems [1]. Moreover, in the past years the movement of "green transportation" is raised [2], which make companies invest more on environment protection. However, freight movement is a subject of uncertainty where demand is one of the major sources of uncertainty, it is unknown until a specific period; we may have some random delays because of moving goods faraway; last minute changes due to equipment breakdown and the personnel don't follow the plan once they're on the field. Hence, we cannot apply one single predefined strategy for every uncertain situation [3].

The problem was formulated as a bi-objective two-stage stochastic program that focuses on improving freight services quality by minimizing the total costs including operations and network costs, as well as reducing environmental effects of integrating such a model. Taking into account equipment's maintenance, we can decide the fleet type to be assigned to each period and the staff scheduling at first-stage. Once the demand (i.e. product's type, weight and distance) is known, we decide at the second-stage the assignment of each vehicle of the previous considered types. We'll apply that model on road and rail freight transportation.

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Hamiltonian Polynomial Eigenvalue Problems

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Abstract
The principal aim of this work is to give methods that decompose a skew-Hamiltonian matrix M in the form R/R where R is a permuted J-triangular form. Both theoretical and practical aspects are treated. Decomposition M = R/R is the fundamental step to convert a structured even degree polynomial eigenvalue problem $P(\lambda)v=0$ into a standard Hamiltonian eigenproblem $Hv = \lambda v$ [1]. We transform the polynomial eigenvalue problem $P(\lambda)v=0$ to an equivalent skew-Hamiltonian/Hamiltonian pencil [2]. This process is known as linearization. The skew-Hamiltonian/Hamiltonian pencil is converted to a standard Hamiltonian eigenproblem [3].

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Review of Bethe-Weizsäcker Mass Formula Parameters

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Abstract

The Bethe-Weizsäcker mass formula has been proposed with its different parameters representing different aspects of energy involved in the binding energy of the nucleus (shell corrections are not considered in this work) [1], [2]:

$$B(A,Z) = a_v A - a_s A^{1/3} - a_c Z(Z-1)A^{-1/3} - a_a \frac{(N-Z)^2}{A} \pm a_p A^{-3/4}$$

We have used the least-squares adjustments and the new evaluated binding energy table, containing more than 3400 nuclei (updated 2016) [5] to determine empirically the parameters of the formula.

Keywords : Parameters of mass formula, least-squares adjustments, mass data table.

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Two phase simulation of natural convection and entropy generation in a square cavity filled by a nanofluid with rectangular heating cylinder using the generalized Buongiorno's mathematical model

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Abstract
The aim of this work is to investigates the role of natural convection and entropy generation in a square cavity with rectangular heating cylinder. Finite volume method was used to solve in the presented model. Design parameters used in this numerical study are the position and orientation of rectangular block. A wide range of parameters such as the Rayleigh number ($10^3 \leq Ra \leq 10^6$), volume fraction ($0 \leq \varphi \leq 0.05$) and nanoparticles sizes ($25\,nm \leq d_p \leq 145\,nm$) are chosen for investigation. The obtained results were presented by average Nusselt number, streamlines, isotherms and entropy generation. It is observed that the maximum heat transfer rate is reached when the orientation of rectangular heating cylinder is vertical. It is also observed that at low Rayleigh numbers, the particle distribution is fairly non-uniform while at high Ra values particle distribution remains almost Uniform. Furthermore, the reduction of nanoparticles sizes, the increasing of Rayleigh number and volume fraction of nanoparticles shows that the heat transfer rate enhances. The accurate choice for these parameters leads us to obtaining a good heat transfer with minimum entropy generation.

Keywords: rectangular / natural convection / Buongiorno / nanofluid/ entropy generation

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Delay Optimization for the Non-cooperative Slotted ALOHA combined with ZigZag Decoding

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Abstract
In this paper, we optimize the non-cooperative Slotted ALOHA mechanism combined with ZigZag decoding for traffic requiring minimal transmission delay. Our analysis incorporates a Markov model and a game theory study of the former mechanism in order to accurately evaluate the performance of the system. We show through numerical results that the transmission delay increases considerably in congested networks. To this aim, we propose an optimization study of the mechanism to minimize the waiting time of the packets. Our analysis also includes a comparative study with the slotted ALOHA mechanism without Zigzag decoding.

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New Finite Series Related To The Exponential Function

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Abstract

It is well known that the formula of Faà Di Bruno introduced by Johnson [1], El Khomssi et al. [2] and Xu et al. [3], gives us the derivative of a composite function:

$$(gof)^{(n)}=\sum_{\substack{\sum_{i=1}^{n} ia_i=n \\ \sum_{i=1}^{n} a_i=p}} g^{(p)}of \frac{n!}{\prod_{i=1}^{n} a_i!(i!)^{a_i}} \prod_{i=1}^{n}(f^{(i)})^{a_i}$$

The calculation of a finite sum cannot always be simplified, in this communication we propose a method based on a derivation tool as well as a developed formula of Faà Di Bruno found by us in [2], which we apply to a class of functions such as logarithm [4], polynomial [5] and specially the exponential [6] and [7], in order to compute some new non-classical finite series.

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Convergence of Pettis Integrable Random Sets

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Abstract
In this paper, some new results of Pettis integrable random sets are given. A sufficient condition for set-valued Pettis integrable martingale to be regular is provided. At the end of this work, many convergence theorems of conditional expectation of Pettis integrable random sets are established.

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The regularizing effects of somelower order terms in a nonlinear parabolic equation

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Abstract
In this article, we study the regularizing effects of the lower order term in the case of a nonlinear parabolic problem. We show that the presence of certain lowerorder terms has a regularizing effect on the solutions. The obtained results extend some existingones.

Keywords
Nonlinear parabolic equations, regularity of solutions, lower-order perturbation, degenerate coercivity.

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Doubly reflected BSDEs driven by a Lévy process and application in finance

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Abstract

The theory of backward stochastic differential equations (BSDEs) was developed by Pardoux and Peng [5]. El-Karoui et al. [1] have introduced the notion of one barrier reflected BSDE, which is a backward equation but the solution is forced to stay above a lower obstacle. Later Cvitanic and Karatzas [2] studied BSDEs with two reflecting barriers (DRBSDEs). And after, El Otmani [3] consider a reflected BSDE driven by a Brownian motion and the martingales of Teugels associated with a pure jump independent Lévy process and rcll obstacle. Recently, Marzougue and El Otmani [4] discussed the case of DRBSDE with the so-called stochastic Lipschitz coefficient.
In this work, we study the doubly reflected backward stochastic differential equations (DRBSDEs) driven by a Lévy process and their applications in finance, in particular hedging of American game option. We proved the existence an uniqueness of a solution to DRBSDEs where the coefficient is stochastic Lipschitz by means of the penalization method.

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1st International Conference on Research in Applied Mathematics and Computer Science
ICRAMCS 2019

A meshless method based on the moving least squares (MLS) approximation for the numerical solution of two-dimensional linear integral equations of the second kind on non-rectangular domains

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Abstract
In this paper, we present a numerical method for solving two-dimensional linear Fredholm integral equations of the second kind on a non-rectangular domain. The scheme utilizes the shape functions of the moving least squares (MLS) approximation constructed on scattered points as a basis in the discrete collocation method. The MLS methodology is an effective technique for approximating unknown functions which involves a locally weighted least square polynomial fitting. The proposed method is meshless, since it does not need any background mesh or cell structures and so it is independent of the geometry of the domain. Error analysis of this method is also investigated. Some numerical examples are provided to illustrate the accuracy and computational efficiency of the method.

key words: Meshless method, Moving least squares, Integral equation, Non-rectangular domain, Error analysis.

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Adaptation de maillage d'un problème de perturbations singulières d'ordre deux

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Abstract

Dans ce travail on étudie un problème de perturbations singulières d'ordre 2 de type Dirichlet. La présence du paramètre sans dimension ε devant le laplacien est, sans nul doute un signe de perturbations, rendant le comportement de la solution singulier, quand il tend vers 0 [5]. A cet égard, plusieurs méthodes mathématiques ont été développées, dans le but de chercher une solution approchée, sous forme d'un développement asymptotique des puissances du ε [3-4]. Dans le cas étudié de ce travail, nous nous intéressons à la technique de l'adaptation de maillage [6] qui est, un outil extrêmement puissant et indispensable dans de nombreux domaines : physiques, mécaniques, aérodynamiques...etc. Pour ce faire, on utilise des estimations d'erreur a posteriori qui, ne prennent -par définition- en compte que des quantités accessibles au calcul à savoir : la solution approchée, le maillage et les données du problème modèle. Parmi les estimations d'erreur a posteriori utilisées, on adopte les estimateurs par résidu qui ont été introduits par Babushka et Rheinboldt [1], puis leur analyse a été étendue par J. Baranger et H. EL AMRI [2] et par Verfurth [7].

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Optimization of the lifespan of accelerators

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Abstract

The least squares method [1] is a form of mathematical regression analysis that finds the line of best fit for a dataset, providing a visual demonstration of the relationship between the data points. The VSM (Support Vector Machine) method [2] is used to identify Weibull law parameters; and as a consequence, the control of the law of degradation of a good makes it possible to react at the opportune moment. By using the method of least squares, the goal is to find a straight line (D), i.e. to specify the coefficients a and b, such that the sum of the distances "d_i " is minimal, it is equivalent to minimizing $\sum_{i=1}^{n} d_i^2$ with n the number of points. And based on the VSM method, the goal is to define the coefficients w and b using the perceptron algorithm and we define the optimal hyperplan of classification. Several methods exist in the literature and which make it possible to associate a mathematical expression with a cloud of points, this is the case [3]. For details of the weibull modele, see the books [4-6]. To have a good economic performance of an entity, we must guarantee the optimization of the lifespan of its equipment, therefore the control of the maintenance policy. In this communication, we propose a structured methodology based on powerful probability laws that describe the behavior of accelerators. In order to find the exact results, we compare the two methods and choose the most efficient.

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On generalized approximate convexity in nonsmooth vector optimization

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Abstract

In this paper, we consider a vector optimization problem involving generalized approximately convex functions. We formulate approximate vector variational inequalities in terms of convexificators and solve the vector optimization problem. Under the assumptions of generalized approximate convexity, we establish ecessary and sufficient conditions for a solution of approximate vector variational inequality to be an approximate efficient solution of the vector optimization problem.

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Properties of the Correlation Matrix Implied by a Recursive Path Model: Contribution to Path Analysis

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Abstract

Path analysis is a set of statistical techniques to examine the relationships of cause and effect between a group of variables [1-2-3]. Path analysis uses the correlations between variables to estimate the magnitude of causality between these variables [1-2]. The implied correlation matrix can be computed using two different methods: Joreskog's method [4] and Finite Iterative method [3]. In this communication, we present the properties of last method that allow us to do explicit and simplistic computations. We have announced and demonstrate these properties and give some examples of illustrations to visualize the difference between the classical approach, that uses the finite difference method to compute the gradient vectors and the Hessian matrices, and the new approach based on the seen properties. We have implemented the R program to simulate random empirical correlation matrices. Then, we did a benchmarking between these two approaches. In addition to that, we applied both methods on data [1] to say this difference in a real example.

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Numerical simulation of quantum crystals, with and without defects

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Abstract

In this talk, we consider quantum crystals in the reduced Hartree-Fock (rHF) framework. The nuclei are supposed to be classical particles. We consider two types of crystals. The first ones are perfect crystals, where the nuclei are arraged according to a periodic lattice. The second one are crystals with local defects, where the nuclear distribution is of the form mu =mu_per+nu, where $mu_per is a periodic nuclear distribution corresponding to a reference perfect crystal and nu represents the defect. We assume that mu decays at infinity.

A good numerical approximation of these materials is obtained using the supercell model. It consists in restricting the system to a box of (large) finite size with periodic boundary conditions. For perfect crystals, we prove in [1] that the supercell model converges to the whole space model exponentially, when the size of the supercell goes to infinity. For crystals with local defects, we prove in [2] that the defect energy admits an expansion of the form

$$F^\nu \simeq F_L^\nu+ a/L+O(1/L^3)$$

when the defect is small. The coefficient a can be computed using the supercell calculation. The convergence is thus accelerated to the order L^{-3} without any additional computational cost.

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Compatibilité des structures riemanniennes et structures k-symplectiques polarisées

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Abstract

On se propose d'étudier les propriétés métriques des variétés k-symplectiques polarisées adaptées à une métrique riemanniennes reliées par des champs d'endomorphismes antisymétriques, dont on a dégagé l'idée maitresse du travail de Robert Lutz sur la géométrie riemannienne des structures de contact[8], qui s'inspire des travaux de S. Sasaki dont rend compte la monographie de David Blair en 1976[5].

Divers exemples et résultats mettant en relief la structure polarisée vectorielle et la métrique riemannienne sont données à travers des champs de tenseurs du type (1,1), ce qui a conduit l'introduction des variétés de Kähler vectorielles polarisées.

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Structures de Poisson polarisées

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Abstract
Ce travail est la suite d'un travail antérieure de A. Awane sur lequel on introduit la notion de variété de Poisson polarisée qui se place dans le cadre de la structure symplectique polarisée, qui est une variété munie d'un feuilletage et d'un crochet de Poisson associée à des applications hamiltoniennes polarisées. En élargissant ainsi diverses propriétés de la structure du Poisson subordonnées à une variété symplectique polarisée.
Dans cette perspective, une structure Poisson polarisée est définie sur une variété feuilleté $(M, \mathfrak{F})$ par un couple $(\mathfrak{H}(M, \mathfrak{F}), P)$ où $\mathfrak{H}(M, \mathfrak{F})$est un sous-module de l'espace $C^{\infty}(M, \mathbb{R})$ de fonctions différentiables à valeurs dans $\mathbb{R}$ sur M, sur l'anneau des fonctions basiques, et P est une application bilinéaire$C^{\infty}(M)$ –antisymétrique

$$P: \Lambda_1(M) \times \Lambda_1(M) \longrightarrow C^{\infty}(M, \mathbb{R})$$

nous nous proposons d'étudier la structure de Poisson polarisée et les rapports entre les variétés de Poisson polarisées et les distributions caractéristiques dans le cas régulier. En donnant quelques exemples des variétés de variétés de Poisson polarisées.

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Modélisation et analyse numérique de la nocivité du défaut de fatigue-corrosion dans un tube sous pression

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Abstract
Les conduites utilisées pour le transport de fluides sous pression peuvent présenter des défauts dûs à une erreur de fabrication ou à un impact avec un corps étranger [1] ou à une corrosion. Ces défauts se présentent sous forme de fissures [2] qui se propagent jusqu'à la rupture de la structure mécanique. Ce papier traite les défauts de corrosion sous contrainte [3] dans un tube métallique en acier API X52, en particulier le défaut de fatigue-corrosion.
Un modèle numérique proposé et validé est utilisé pour évaluer la nocivité de ce défaut en s'appuyant sur la variation des fréquences d'application des sollicitations et de deux milieux corrosifs. En se basant sur la loi de PARIS [4] modifiée, une étude paramétrique est menée, dans laquelle les principaux paramètres qui affectent la durée de vie en fatigue corrosion [5] sont mis en valeur, en particulier la fréquence de sollicitation, l'intensité de contrainte limite K_{ICSC} et la vitesse de progression de la fissure (da/dt)p sous l'effet de la corrosion sous contrainte .
L'étude a montré que la configuration la plus nocive est celle d'un défaut de corrosion avec fissure interne longitudinale à faible fréquence de sollicitations dans un milieu corrosif à base d'Ethanol.

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Mathematical Modeling of the Impact of Immigrations on The Dynamic of Diseases in Morocco

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Abstract

The aim of this paper is to mathematically model the impact of the flow of immigrants from sub-Saharan countries as well as Asia on the dynamic of the diseases in Morocco. The evolution of the diseases showed that diseases are different in their dynamic depending on their nature and their source of transmission.

Therefore, our goal is to investigate the dynamic of multiple imported diseases on the Moroccan population and how the current health care policies would help to maintain disease free environment.

Keywords : Dynamic of the Diseases, SEIR Model, Basic Reproduction Number, Multiple Imported Diseases.

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Existence Of A Renormalized Solution For Some Nonlinear Anisotropic Elliptic Problems

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Abstract
Our aim is to study a general class of nonlinear anisotropic elliptic problems associated with the differential inclusion:

$$(E,f): \quad \begin{cases} ß(u) - div(a(x,Du) + F(u)) \ni f \text{ in } \Omega \\ u = 0 \quad \text{on} \end{cases}$$

with a right-hand side f which is assumed to belong *to* $L^1(\Omega)$ for (E,f). A vector field $a(.,.)$ is a Caratheodory function. Furthermore, $F: \mathbb{R} \to \mathbb{R}^N$ is locally lipschitz continuous and $\beta: \mathbb{R} \to 2^{\mathbb{R}}$ is a set valued, maximal monotone mapping such that $0 \in \beta(0)$. Using trunction techniques and the generalized monotonicity method in the framework of Anisotropic Sobolev spaces we prove the existence of renormalized solutions for $L^1 -$ data.

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NUMERICAL MODELING OF THE BEST INSTANTANEOUS DECISION IN INVENTORY MANAGEMENT

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Abstract

Inventories of a stock of product allow companies to coordinate temporarily its activities of purchase and sale. Therefore, the stock insures the balance or the amortization of the effects of the seasonal or cyclic fluctuation in the commands. The challenge of managing the inventory of a company is to have visibility on its stocks and methodologies appropriate to different situations. However, building and maintaining a stock entails costs, the minimization of which must be an important objective for managers. It is in this spirit where this work lies, which consists in contributing to the numerical modeling of the best instantaneous decision in the inventory management:

—We give a worksheet to follow strictly stock movements will use it vouchers of entry and vouchers of exit of the goods;

—We model mathematically the problem posed by a linear program in binary numbers (LPBN) and a linear program in entire numbers (LPEN);

—We give a practical solution and a digital technology of the problem;

—We illustrate the work by examples;

—The conclusion resumes the main lines of this study and our contribution. It also shows the diverse extra time and the possible perspectives of this work.

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Necessary optimality conditions for a bilevel multiobjective programming problem via a Ψ- reformulation

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Abstract

In this paper, we are concerned with a bilevel multiobjective optimization problem (P). First, using Ψ, a function introduced by Gadhi and Dempe [16], we transform (P) into a one level optimization problem (P^*). Second, on terms of convexificators, using a scalarization technique, we derive a Karash-Kuhn-Tucker (KKT)-type necessary optimality conditions to the initial problem (P) under ageneralized Abadie constraint qualification without the assumption that thelower-level problem satisfies the Mangasarian Fromovitz constraint qualification. Some examples have been introduced to illustrate our results.

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An upper bound for the arrow-simplicity s(T) of a tournament T

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Abstract

The arrow-simplicity s(T) of a tournament T is the minimum number of arcs that must be reversed to make T non simple.

V. Müller et J. Pelant [1] prove that s(T)=((n-1)/2) if and only if T is doubly regular. Recall that a n-tournament T is doubly regular if there is an integer k such that every pair of vertices of T dominates exactly k vertices. If such tournament exists then n≡3mod(4) and k=((n-3)/4).

In this work, we give an upper bound for the arrow-simplicity s(T) of a tournament T where T is an n-tournaments and n≢3mod(4).

Keywords: Tournaments, arrow-simplicity, simple tournament, transitive tournament, Seidel matrix.

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Uniform algebraic hyperbolic B-spline curves and wavelets.

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Abstract
In this work, we present a new kind of uniform B-splines, called algebraic hyperbolic B-splines generated over the space spanned by $\Gamma_\alpha = \{1, \varphi, \varphi^2, \ldots, \varphi^{k-3}, cosh(\alpha\varphi), sinh(\alpha\varphi)\}$, in which k is an integer larger than or equal to 3 and α is a tension parameter. Then, we introduce the notion of algebraic hyperbolic B-splines curves. Moreover, we present a generalized subdivision and reverse subdivision scheme of arbitrary order with a tension parameter for curve design. Numerical tests for illustrating hyperbolic B-spline curves and subdivision scheme are presented.

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Sur les Sections Harmoniques et leurs Stabilité

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Abstract
Soit (E,π,M) un fibré vectoriel à base Riemannienne (M,g), on suppose que E est muni d'une métrique fibrée h, et d'une connexion compatible avec h. Dans \cite{Alb1}, R. Albuquerque a introduit une classe importante de métriques riemanniennes à deux poids sur l'espace total E. Dans cet exposé, on suppose que E est muni d'une métrique riemannienne G de cette classe, et on se propose de discuter l'harmonicité des sections de E en tant que des applications de (M,g) vers (E,G). Ainsi, on discute la G-harmonicité et les sections verticalement harmoniques. Finalement, on donne quelque résultats de stabilité des sections harmoniques.

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Carleman estimate and application to an inverse coefficients problem for a strongly coupled parabolic system

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Abstract

This work is devoted to establish new Carleman estimate with one observation for a strongly parabolic system. Roughly speaking, it is an improvement of the work [2] in the sense that we determine two coefficients by observations in an arbitrary subdomain of only one component in a strongly coupled parabolic system. The key ingredient, to prove our results, is the shifted Carleman estimate obtained in the article [1].

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1st International Conference on Research in Applied Mathematics and Computer Science
ICRAMCS 2019

Common feedback stabilization of control stochastic differential equations

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Abstract

Common or simultaneous stabilization attempts to find a single controller that would stabilize a finite collection of systems. Since the work of [4], [5], this problem has received considerable attention. However, most of the existing papers focus on linear systems. The purpose of this communication is to extend the result proved by Zhang et al [6] on the simultaneous stabilization of deterministic control systems to the simultaneous feedback stabilization of control stochastic differential equations. Based on the generalized stochastic Lyapunov theorem [2], we derive a sufficient condition for the simultaneous global asymptotic stabilization in probability by a continuous feedback explicitly computed. Note that, since the proposed feedback is only continuous, not locally Lipschtiz, the existing control methods, which use some fundamental stochastic stability theories presented in [1] and [3], are inapplicable to a lot of systems contained in the class of stochastic systems considered in this communication.

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Relative error regression under random censorship data

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Abstract

In this work, we investigate the asymptotic properties of a nonparametric estimator of the relative error regression, in the case of a scalar censored response, we use the mean squared relative error as a loss function to construct a nonparametric estimator of the regression function of these censored data. We establish the strong almost complete convergence rate of these estimators.

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Calculus rules of generalized weak ε-subdifferential for vector valued mappings and applications

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Abstract

In the last few years, the study of vector optimization has led many authors to introduce a notion of subdifferential for non differentiable vector valued mappings. Recently, the notion of generalized ε-subdifferential is introduced in [1], which is a global notion and weaker than the strong subdifferential. The authors developed some proprieties, established some formulas for the sum and the difference of two vector mappings and give an application dealing with the optimality conditions for a vector optimization problem. The main objective of this work is to introduce in the Pareto sense a new concept of subdifferential called generalized weak ε-subdifferential and we focus our interest on studying its proprieties and stating some calculus rules.

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Cryptography over special ring

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Abstract

In computer science, a one-way function is a function that is easy to compute on every input, but hard to invert given the image of a random input. Here, "easy" and "hard" are to be understood in the sense of computational complexity theory, specifically the theory of polynomial time problems. Not being one-to-one is not considered sufficient of a function for it to be called one-way (see Theoretical Definition hereinafter), [4].

In classical cryptography, the Hill cipher is a polygraph substitution cipher based on linear algebra, [2, 3]. In this work, we will present an example of encryption and decryption scheme , by using the elliptic curve , [1] defined over a special ring $\mathbb{F}_q[e]$; $e^2 = e$, where $\mathbb{F}_q$ be a finite field of q elements, q is a power of 3. In a first time, we study the arithmetic of this ring. In addition, using the Weierstrass equation, we define the elliptic curve $E_{a,b}(\mathbb{F}_q[e])$; $(a, b) \in (\mathbb{F}_q[e])^2$ and we give a one-way function over this curve.

Key Words: Finite field, Finite ring, Local ring, Elliptic curves, Cryptography.

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Enriched Finite Element solution for three-dimensional transient diffusion problems

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Abstract

A robust enriched finite element method is proposed for the numerical solution of heat conduction in composite materials. The governing equations consist of a nonlinear transient diffusion problem with discontinuous coefficients. These coefficients depend on the conduction properties of each material in the composite enclosures. The finite element space is enriched using a class of exponential functions accounting for the heat decay in the composite material. The proposed enriched finite element method demonstrates an immense reduction in the number of degrees of freedom required to achieve a fixed accuracy compared to the conventional finite element method. The performance of the proposed method is assessed for numerical simulation of heat conduction in composite materials formed of Zirconium dioxide (ZrO2) and Titanium alloy (Ti 6Al-4V). Comparison to the conventional finite element method is also presented in this study.

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Reflected BSDE with optional barrier and stochastic Lipschitz coefficient

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Abstract

we prove the existence and uniqueness of a solution to reflected backward stochastic differential equations with a lower obstacle which is assumed to be right upper-semicontinuous. The result is established where the coefficient is stochastic Lipschitz by using some tools from the general theory of processes such as Mertens decomposition of optional strong supermartingales and other tools from optimal stopping theory.

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Sequential Approximate Weak Optimality Conditions for Multiobjective Fractional Programming Problems

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Abstract

Multiobjective fractional programming problem has received of much interest in recent past (see [1], [2] and [3]). This problem arise in different areas of modern research such as economics, information theory, game theory and numerous decision problems in management science.

To get optimality conditions for an optimal Pareto solution of a multiobjective fractional programming problem, we often formulate an equivalent intermediate vector or scalar convex problem by using a parametric approach.

However, for deriving an optimality condition, such vector or scalar convex program require a regularity condition as generalized Slater's constraint qualification but we know that generally the regularity condition do not always hold for finite dimensional optimization problems and frequently fail for infinite dimensional optimization problems arising in applications.

In order to eliminate these drawbacks, many authors investigate sequential optimality conditions characterizing optimal solution for vector or scalar convex optimization problems which hold without any constraint qualifications.

The purpose of this work is to develop sequential optimality conditions characterizing weakly approximate efficient solutions for multiobjective fractional programming problem. Our approach is based essentially on the calculus rule for the sums of a finite family of convex lower semicontinuous functions.

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A Stochastic Square of the Rayleigh Diffusion Process

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Abstract
This work describes a study of a new one-dimensional homogeneous stochastic process termed the square of the Rayleigh process. The model is based on the homogeneous stochastic Rayleigh diffusion process [1] which is examined from the perspective of a nonlinear stochastic differential equation and used in various aspects of stochastic modelling such as physics, stochastic finance, demographic and economic [2]. In this study, we first obtain the transition probability density function of the model after which we determine the trend functions (conditional and non-conditional). Then, the drift parameters are estimated by maximum likelihood on the basis of continuous sampling of the process [3]. Finally, in the diffusion coefficient, we consider the problem of parameter estimation, doing so by a numerical approximation.

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μ-Pseudo almost periodic solutions for some hyperbolic evolution equations with Stepanov pseudo almost periodic forcing terms

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Abstract

This work deals with the existence and uniqueness of μ-pseudo almost periodic solutions to some semilinear hyperbolic evolution equations with inhomogeneous boundary conditions of the form

$$(1)\quad \begin{cases} u'(t) = A_m\, u(t) + f(t,u(t)), t \in R, \\ Lu(t) = g(t,u(t)), t \in R \end{cases}$$

The first equation stands in a Banach space X, called state space, and the second one in a Banach space ∂X, called boundary space. We assume that A:= A_m/KerL generates a C_0-semigroup on a Banach space X. Under Greiner's assumptions (see [4]) on the boundary operator L, and the forcing terms f and g, taking values in X and in ∂X respectively, are only μ-pseudo almost periodic in the sense of Stepanov, we show that there is a unique μ-pseudo almost periodic solution to (1) which satisfies a variation of constant formula .

Keywords

μ- Stepanov pseudo almost periodic function, hyperbolic evolution equations, Exponential dichotomy, boundary evolution equations and variation of constant formula.

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A covering method combined with the Hook-Jeeves algorithm for continuous global optimization problems

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Abstract

In this paper, we consider the following bound constrained global optimization problem of the form:

$$f^* = \min_{x \in D} f(x) \qquad \text{(P)}$$

where the objective function $f : IR^n \to IR$ is only continuous and $D = \prod_{i=1}^{n} [L_i, U_i] \subset IR^n$, with L_i, U_i are real numbers for $i = 1;...,n$. The problem (P) is very important in practical optimization because numerous practical problems in engineering, economics, telecommunication and so on, may be formulated as optimization problems that involve objective functions which are only continuous and do not possess strong mathematical properties (such as convexity, differentiability, Lipschitz continuity; etc.) [1]. The problems in these disciplines become more and more complicated and demand more powerful solvers in terms of time and memory. In this paper a method for solving the global optimization problems where the objective function is only continuous is presented. It is based on the generation of parameterized curves combined with the Evtushenko algorithm [2]. It is established that this method converges in a finite number of iterations to the global minimum [3]. To accelerate the corresponding mixed algorithm we have incorporated the deterministic local optimization method of Hooke and Jeeves [4]. Numerical experiments are performed on some typical test problems and the detailed numerical results show that the algorithm is promising.

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ICRAMCS 2019

ABSTRACTS

SESSION II : DYNAMICAL SYSTEMS AND CONTROL

Stochastic stability of a class of Markovian jump systems with delay

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Abstract

This communication concerning the stochastic stability of a class of the linear discrete-time markovian jump systems whose the dwell-time is driven by a Poison process. Several notions of stochastic stability are considered and corresponding stability criteria are derived. In recent years, linear Markovian jump systems (LMJS) have received an extensive attention from researchers due to their flexibility in modeling real-world problems, see [1,2] . They have been used in many practical systems, which are subjected to random abrupt changes in the inputs, internal variables and other system parameters caused by the occurrence of some inner discrete events in the system such as random failures of the components, change of the subsystems interconnections and so on [1, 3, 4]. On the other hand, time-delay, an inherent characteristic of many practical systems, is ubiquitous in dynamical systems and usually is a source of poor performance, oscillations or instability [5]. Thus, the problem of stability analysis and control of time-delay systems is essential and of great importance for both theoretical and practical reasons. This problem has attracted considerable attention from researchers in the field of systems and control theory [6].

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Energy decay for a weakly nonlinear damped porous system with a nonlinear delay

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Abstract: This paper considers a one-dimensional porous system damped with a weakly nonlinear feedback in the presence of a nonlinear delay. Under appropriate assumptions on the weight of the delay and without imposing any restrictive growth assumption on the damping term at the origin, we establish an energy decay rate, using a perturbed energy method and some properties of convex functions in case of the same speed of propagation in the two equations of the system. Furthermore, we prove a global existence result using the Faedo-Galerkin procedure.

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Mathematical Modeling of the Monthly Mean Temperature of Morocco using Exponential Autoregressive Processes

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Abstract

The monthly mean temperature time series is important to evaluate how the climate changes over time. That's why we consider the problem of mathematical modeling of the monthly mean temperature of Morocco using Exponential Autoregressive (EXPAR) processes. The EXPAR model was introduced by Haggan and Ozaki [1] to reproduce non-linear random vibrations, Tong [2] have shown that it can exhibit nonlinear features as amplitude-dependent frequency, jump phenomena and limit cycles, for further theory details see [3-4-5]. In this work we provide a full approach for modeling and analysis with EXPAR models, giving in details the process of modeling from the mathematical justification for the use of such sophisticated model to the estimation procedure. The results show that the monthly mean temperature is well fitted by the EXPAR model with very small prediction errors.

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Stabilization for a class of second order semilinear systems

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Abstract

This work considers the stabilization for a class of second order semilinear systems evolving in a spatial domain Ω. We give sufficient conditions for exponential stabilization using feedback controls. Moreover, we study the exponential and strong stabilization for the case of second order bilinear systems. The obtained results are illustrated by many examples with simulations.

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On the boundary controllability of the one-dimensional degenerate coupled parabolic systems

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Abstract

We consider the controllability of the one dimensional degenerate coupled parabolic system with fewer controls than equations. We particularly investigate the well-posedness of the problem and then we give necessary and sufficient condition for the null controllability by means of boundary control acting at some part of the boundary of the space domain.

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Amélioration de la Total Productive Maintenance

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Résumé :

La Total Productive Maintenance (TPM) est une démarche pour améliorer continuellement le rendement des ressources de production [1-2]. Elle intègre le management, l'écoute et la responsabilisation des opérateurs. La TPM a pour objectifs de perfectionner le taux de rendement synthétique (TRS) [3], de rendre le processus de fabrication et les équipements plus fiables et de motiver le personnel en lui accordant plus d'autonomie et plus de responsabilités.

La démarche TPM s'appuie sur huit piliers stratégiques [4] :

- Amélioration de la productivité en appliquant des procédés visant à réduire et éliminer les pertes et gaspillages,
- Exploitation de la maintenance autonome : des outils sont utilisés afin de solutionner les anomalies du système,
- Organisation des maintenances planifiées en favorisant la prévention,
- Développement des compétences du personnel en adaptant des plans de formation,
- Maîtrise de la conception des produits et des équipements pour avoir des produits faciles à fabriquer et des équipements faciles à utiliser,
- Maîtrise de la Qualité pour obtenir, du premier coup, la parfaite qualité des caractéristiques critiques des produits fabriqués,
- Proposition des plans d'actions pour rendre les services fonctionnels,
- Garantie de la sécurité dans la structure de l'entreprise.

Dans ce travail de recherche nous proposons une démarche structurée et simplifiée pour évaluer les indicateurs de performance cités ci-dessus.

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Assessing Excellence in Industrial Enterprises using Structural Equation Modeling

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Abstract

Nowadays, excellence is considered to be an important value, and a goal to be pursued by industrial enterprises, in order to increase their global performance based on economic, social and environmental indicators to satisfy all their stakeholders. In this context, industrial enterprises are invited to measure their excellence level for continuous improvement [1]. The main purpose of this paper is to introduce a new statistical tool for measuring the Excellence Level Index (ELI), using Partial Least Squares approach of Structural Equation Modeling (PLS-SEM), which is widely used for representing, estimating, and testing a network of relationships between observed (measured X_{ij}) and unobserved (latent ξ_i) variables [2,4,5].

Inspired by the European Foundation of Quality Management (EFQM) concepts about excellence [3], the Excellence Level Index ELI is formed by six latent variables: Leadership & Strategy, People focus, Resources & Partnerships, Process, and Overall Results. Each latent variable has several reflecting manifest variables based on the EFQM excellence framework and evaluated by the main stakeholders of the concerned company. An implementation of the PLS-SEM estimation is run on the XLSAT software.

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Energy decay rate of a linear thermoelastic Bresse system with second sound under new conditions on the coefficients of the model

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Abstract
In this paper, we consider a linear one-dimensional Thermoelastic Bresse system with second sound consisting of three hyperbolic equations and two parabolic equations coupled in a certain manner under mixed homogeneous Dirichlet-Neumann boundary conditions, where the heat conduction is given by Cattaneo's law. Only one hyperbolic equation is damped via the dissipation from the two parabolic equations, and the other two hyperbolic equations are free. We prove the well-posedness of the system and some decay results depending on new surprising relations between the coefficients of the model and the smoothness of initial data. The proof is based on a combination of the energy method and the frequency domain approach.

Keywords: Decay rates, Frequency domain, Energy method.

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Enlarged observability of semilinear parabolic systems via Lagrangian approach

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Abstract

In this paper, we investigate the regional enlarged observability of distributed parameter systems governed by semilinear parabolic ones. The Lagrangian multiplier approach is used to reconstruct the initial state between two prescribed functions in an internal subregion ω of the whole domain Ω, without the knowledge of the state. This approach leads to an algorithm which is successfully implemented numerically and illustrated by an example that confirm the theoretical results which provided further information about the location of the sensor.

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Strong mixing Gaussian measures for chaotic semigroups

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Abstract
In this talk, we will be concerned with the problem of the existence of an invariant mixing measure considering its connection with the chaotic behavior of linear semigroups on separable Banach spaces. We prove an identity characterizing invariant Gaussian measure involving its covariance operator and the infinitesimal generator of the semigroup. This gives an answer to a question raised by Rudnicki in his inspiring review paper [1]. we use the proved identity to give an another proof to Bayert theorem for the existence of an invariant mixing Gaussian measure [2].

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Stability of some linear systems of thermoelasticity

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Abstract

In this article, we are interested in proving the stabilization of some linear systems of thermoelasticity. Firstly, under suitable assumptions and using decoupling techniques, we prove the compactness of the difference between the porous thermoelastic semigroup, its decoupled one and the two second order equations in the decoupled system [1]. This will be achieved by proving the norm continuity of this difference and the compactness of the difference between the resolvents of their generators. Consequently, these three semi-groups have the same essential spectrum, what allows to deduce the stability of one from the other. The second and the third axis of this article aim is to study the stabilization of thermoelastic (and porous thermoelastic respectively) system with Cattaneo law and internal delay [2-3]. Under the boundedness of the associated transfer function and a condition on the coupling operator and assuming that the weight of the feedback term with delay is smaller than the one without delay, we prove that the exponential stability of thermoelastic (and porous thermoelastic respectively) system with Cattaneo law and internal delay is equivalent to the observability inequality of its conservative associated system.

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Output feedback stabilization of distributed bilinear time delay systems

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Abstract

The current paper discusses the output stabilization of distributed bilinear systems with time delay in a Hilbert space. To this end, we will propose a continuous and bounded feedback control that guarantee both strong and weak output stabilization. The obtained results are illustrated by examples and numerical simulations.

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TOWARD AN OPTIMIZATION OF SHIP COLLISION AVOIDANCE MANEUVERS APPROACH IN COMPLIANCE WITH COLREG CONVENTION.

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Abstract

For decades, the calculus and optimization of ship's navigation without collision risks presents a major issue for maritime domain. The continuous increasing of maritime traffic rends the mitigation of this risk a challenge for the scientific researches' community. The safety researchers are called to cope with the complexity of the safe ship routing optimization. Several solutions are proposed to enhance the maritime safety. The topic is covered using different approaches. Some of these approaches consist of studying the conflict problem as an optimal control problem with state constraints, others rely on calculating risks of collisions in ocean navigation by stochastic methods. This work is focused on an analytical study of this approaches in order to discuss the limitations of each approach and identify areas for improvement.

Index Terms:

Collision avoidance, ship domain, safe trajectory, optimal control, collision risk, optimization, COLREG.

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Commande non linéaire de l'AGC par backstepping

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Résumé

La commande dynamique de la forme de la bande d'acier est un problème important dans le laminoir à froid réversible et il est généralement associé au système de contrôle automatique de jauge (AGC).Cette orientation est reflétée dans la littérature par de nombreuses approches de commande des processus de laminage. Des méthodes d'intelligence artificielle basées sur un contrôleur PI flou de smith [1] et des réseaux de neurones artificiels [2]. Une approche de conception logicielle de haut niveau est présentée dans [3] et Dans [4] la commande prédictive non-linéaire. Cette technologie de commande de l'AGC repose sur les contrôleurs PID [5]pour obtenir l'épaisseur de bande souhaitée. Le problème majeur de ces contrôleurs est sa grande sensibilité aux variations de paramètres et aux perturbations. Par conséquent, la commande de cette classe de systèmes devrait être basée sur des modèles mathématiques [6] et des stratégies non linéaires parce que la dynamique de l'AGC est hautement non linéaire. Pour remédier à ces problèmes difficiles, on propose dans cette communication une commande non linéaire par backstepping pour surmonter tous les effets de non linéarité du système de l'AGC. En fait, les résultats de la simulation à l'aide du logiciel SIMULINK montrent une meilleure performance et robuste Stabilité sous l'action de la stratégie de backstepping.

Keywords : AGC ;backstepping ;lyapunov ;laminoir à froid

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Gradient stabilization of infinite dimensional bilinear systems

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Abstract
The aim of this work is to investigate gradient stabilization of infinite dimensional bilinear systems. Then under sufficient conditions, we establish exponential, strong and weak gradient stabilization. The obtained results are illustrated by simulations.

Keywords: Gradient stabilization - Infinite dimensional systems - Bilinear systems - Switching control - Feedback control.

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Modeling the rumors spread as an epidemic: An optimal control approach

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Abstract
The rumor is unconfirmed information or from an anonymous source capable of distorting scientific facts and influencing political opinions and causing significant impact on people's social, political and economic life. Traditionally, it has been spread by word of mouth, but nowadays, with the emergence of the Internet, rumors can be spread by instant messaging, emails or publications ... With this new mode of spread, it can induce a cloud of pressure, anxiety and panic. In order to control the spread of rumors, we adopt a new discrete epidemic model, SRI (individuals who propagate information and those who do not), to describe the dynamics of the spread of a rumor in a region. Based on the fact that awareness can be partially or fully effective in the fight against most epidemics. We applied a discrete version of the Pontryagin's maximum principle to our model with the control variable representing the effect of awareness programs, to state the necessary conditions, and the characterization of the optimal control reducing the propagation of the rumor.

Keywords
Rumor, modeling, optimal control, pontryagin's principle, epidemic.

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Fuzzy Gain Scheduling Of Sliding Mode Control With Conditionally Integral Action For A Classes Of Nonlinear Systems

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Abstract

The paper presents a fuzzy gain-scheduling [1-3] control design procedure for sliding mode control with conditionally integral action [4-6] for classes of nonlinear systems. The method is applied to a nonlinear underactuated system. A first, the sliding mode control is designed to stabilize the process. Then, a Fuzzy gain scheduling is used to ensure zero steady-state control error. Finally, the proposed controller design is illustrated by application to control single inverted pendulum with simulation in MATLAB environment.

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Approche de contrôle optimale au voisinage du blocage du voyage sur les correctifs à l'aide du modèle d'épidémie à temps discret SIRS

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Résumé

Avec des milliers de personnes qui se déplacent d'une région à une autre, dans une chaîne de régions étroitement interconnectées par rapport à d'autres régions d'un vaste domaine donné, une épidémie peut se propager rapidement autour de celle-ci à partir de n'importe quel point frontalier. Il peut parfois être urgent d'imposer des restrictions de déplacement afin d'empêcher la propagation de l'infection. Dans le but de protéger les personnes susceptibles de cette chaîne de contacter les voyageurs infectés en provenance de ses voisins, nous suivons la méthode dite de contrôle optimal du voisinage bloquant les voyages avec l'introduction de la notion de patch pour représenter notre groupe de régions ciblé lorsque l'épidémie cadre de modélisation se présente sous la forme d'un système à temps discret SIRS (Susceptible-Infected-Removed-Susceptible). Une version discrète du principe de maximum de Pontryagin est utilisée pour la caractérisation du contrôle optimal bloquant la course. Enfin, à l'aide de schémas itératifs progressifs-régressifs discrets, nous fournissons des simulations cellulaires d'un exemple de domaine composé de 100 régions et où la chaîne ciblée comprend 7 régions.

Mots clés

Multi-regions; modèle épidémique; contrôle optimal; travel-blocking; patches; Le modèle SIRS;

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Oscillation de la pluie dans un modèle de l'orage

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Résumé
On considère dans [6] un système d'équations intégro-différentielles modélisant l'écoulement ascendant de l'air humide avec la condensation de la vapeur d'eau , analogue à celui de [3], mais corrigé pour être plus conforme aux conditions naturelles. Dans le résultat du calcul on trouve l'oscillation de la vitesse de l'écoulement et de la quantité de l'eau liquide contenue dans l'air, qui peut s'amplifier, peut s'amortir ou peut être essentiellement stable. On démontre aussi l'existence et l'unicité de la solution de l'équation de l'état hydrostatique de l'air humide.

Mots-clés
Équation intégro-différentielle, oscillation, mouvement de l'air, condensation de la vapeur d'eau.

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Output stabilization for a class of semi-linear distributed systems

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Abstract

In this paper, we study the stabilization of the state fractional spatial derivative, using Riemann Liouville derivative of order $\alpha \in [0, 1[$ for a class of semi-linear distributed systems. Then, we develop sufficient conditions for the exponential and weak stabilization of the fractional output. Hence, we illustrate the obtained results with numerical simulations.

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Uniform Indirect Boundary Controllability of Semi-Discrete 1-d Coupled Wave Equations

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Abstract
In this talk, we treat the problem of uniform exact boundary controllability for the finite-difference space semi-discretization of the 1-d coupled wave equations [1-2] with a control acting only in one equation. First, we show how, after filtering the high frequencies [2-5] of the discrete initial data in an appropriate way, we can construct a sequence of uniformly (with respect to the mesh size) bounded controls. Thus, we prove that the weak limit of the aforementioned sequence is a control for the continuous system. The proof of our results is based on the moment method and on the construction of an explicit biorthogonal sequence [6].

Key words
Coupled wave equations; uniform indirect exact boundary controllability; space semi-discretization; finite differences; moment problem; biorthogonal sequence; filtered spaces.

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Optimal Control Therapy and Vaccination for an TB Model

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Abstract

In this work, we propose to study discrete epidemec models with tuberculosis (TB) disease, following, we consider a TB mathematical model taken from, where reinfection and post-exposure interventions, consisting of a system of non-linear ordinary differential equations representing population dynamics, which this population is divided in five categories S l_1 I L_2 R .
In this communication, we present a strategy for an optimal control in discrete time.
For that, in the model we includes four controls variables representing vaccination or prevention and treatment measures , and we take the best strategy who reducing the number of infected individuals I during the times , and also minimizing the cost of treatment and the cost of vaccination.
So, the Pontryagin's maximum principale, in discrete time, is used to characterize the optimal control. the numerical simulation is carried out using MATLAB. the obtaind results confirm the performance of the optimization strategy.

keywords

Optimal Control
Discrete epidemic model
Vaccination, treatment
Pontryagin's Maximum Principal

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new method for solving physical contact problems

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Abstract

This approach is similar to the primal approach ([1], [2] and [4]) which consists in searching The field at the interface of the sub-domains taking into account the equilibrium of the efforts and the continuity of the fields between the sub-domains; However, according to the laws of behavior governing the interfaces of contact, methods of resolution are proposed. It differs from the dual method ([1], [3] and
[4]) which makes it possible to find the interefort field (mechanical contact) on the interfaces between the sub-domains. These last two approaches lead to the resolution of large condensed systems at the contact interface of sub-domains, either by direct methods or by iterative methods that require the vector matrix product with preconditions. This law contains coefficients that must be determined in order to ensure the convergence and effectiveness of the method. In [5], the mixing coefficient was determined intuitively as a function of the physical constants of the contact bodies (stiffness, conductivity, etc.). It is shown numerically that a wrong choice of this parameter leads to the divergence of the approach. In this article, we will prove mathematically the importance of the choice of the parameter for the convergence, and to restart the optimal choice of the parameter found intuitively.

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Numerical Solution of a Frictional Contact Problem in Thermo-piezoelectricity

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Abstract
We consider a static frictional contact problem in which the material's behavior is modeled with a thermo-electro-elastic constitutive law, the contact is modeled with normal compliance and a version of Coulomb's friction law including the thermal conductivity condition. In the present work we focus on numerical simultions of the contact model introduced by Baiz et al. [2], and extends the results of Barboteu et al. [3] and Sofonea et al. [5] to the case of thermo-piezoelectric materials. To this end we first describe the numerical solution, which is based on the finite element method. Then we treat the friction contact by using a penalty method approach and a version of Newton's method, see Alart et al. [1] and Renard [4] for details. And, finally, we present some numerical examples which validate the theoretical error estimates obtained in the study of this problem.

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A discrete mathematical modeling of dynamics of interconnected virtues

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Abstract
In this paper, we define a discrete model of the dynamics of the interconnected virtues. A virtue means a quality acquired individually and durably and is described as the moral equipment that people needs to do well and be happy. The objective of this work is to treat the modeling and control the system that describes the dynamics of the interconnected virtues. The main goal of this optimal control strategy is to find the optimal control needed in a target virtue to spread it. The characterization of the sought optimal control is derived based on Pontryagin's maximum principle. Numerical examples are given to illustrate the obtained results.

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The Ackermann's Method to Reduce the Sensitivity of a Discrete System with Perturbed Dynamics

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Abstract
The aim of this work is to consider a class of linear discrete-time systems where the dynamics is affected by a structured inevitable disturbance. In order to identify this handicap, we seek to reduce the sensitivity of the system output to the disturbance, parametric unknown but bounded below a threshold Tolerance set before. For this reason, we are interested to propose a control law in closed loop for developing of pole placement technique under the condition of controllability; especially we are based on the Ackermann's method. More precisely, it is sought to determine the gain matrix such that the control defined by the output feedback makes it possible to reduce the sensitivity of the output with respect to the disturbance. To illustrate the obtained results using Matlab/Simulink TM, various examples are presented.

Keywords: Discrete-time systems, sensitivity, stability, pole placement, controllability, Ackermann's method.

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Exponential and weak stabilization for distributed bilinear systems with time delay via bounded feedback control

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Abstract
In this paper we deal with the problem of exponential and weak stabilization for a class of distributed bilinear systems with time delay in a Hilbert space by using a bounded feedback control. Two kinds of stabilizability, namely exponential and weak stabilizability, are investigated respectively. Some illustrating applications to hyperbolic and parabolic partial differential equations are considered.

Keywords: Time delay. Bilinear systems, Feedback control, Exponential stabilization, Weak stabilization.

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Effect of the propagation medium of acoustic waves on human outer ear model

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Abstract

The outer ear is a part of the human auditory periphery which consists of the pinna and the ear canal. Its main function is to amplify the incoming sound signal. The ear canal act like acoustic resonator that selectively amplify and transmit certain frequencies to the middle ear via the eardrum [1].

Various techniques are used to model the ear canal, including physical models, finite element models, and electroacoustic models [2]-[5]. For human ear modeling, it is recommended to take into account the attenuation of sound in the human ear [6].

In the present study, the effect of the propagation medium of acoustic waves through the auditory canal is analyzed.

Gain and phase of the frequency response of several human auditory canals with and without taking into consideration the effect of the attenuation in wave number equation is analyzed. This comparative study will allow us to improve the accuracy of electroacoustic models.

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Modeling the effect of fluids on the integrity of pipelines subjected to dynamic loads

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Abstract

Steel pipelines used in pressurized fluid transportation can be damaged due to mechanical interactions with external objects that may lead to leak or rupture of the structure and cause a human, economic and environmental disaster.

In a pipeline network, pump failure, pipe ruptures or sudden change of state of the valve (opening or closing) creates transient flows that generates a pressure pulse [1], [2] which could generate pipeline vibrations and burst the pipe [3]-[5]. This phenomenon is called water hammer.

To model water hammer phenomenon provoked by instantaneous valve closure/opening at the end of a pipeline, the method of characteristic (MOC) technic [6] is applied to mathematical equations that describes transient flow for four different fluids transported by a pipeline.

The results of pressure variation are then used to allow the assessment of the harmfulness of the transported fluid on the pipe when subjected to dynamic loads.

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The finite horizon impulse control problem : the viscosity solution approach.

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Abstract

We consider stochastic impulse control problems under rather weak assumptions. We use the dynamic programming principle and viscosity solutions approach to show that the value function is a unique viscosity solution for the associated Hamilton-Jacobi-Bellman equation (HJB) partial differential equation (PDE).

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On the Regional Observability of semilinear Time-Fractional Diffusion Systems

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Abstract

The observability is one of the essential problems in control theory [6], in particular the regional observability developed by Zerrik, El Jai and Amouroux for linear systems [5], which consists of finding and reconstructing the initial state on a subregion of the evolution domain instead of the whole domain. This subject has a wide literature for integer order distributed systems [6-2]. Since the fractional calculus has caught a lot of interest over the past years numerous researchers started working in the fractional control theory [4], which will be the theme of this work. The aim of this work is to investigate the concept of the regional observability for a class of semilinear time-fractional diffusion systems of Caputo type, the integer order case was studied by El Alaoui, Bourray and Zerrik [1-3]. We use two approaches for the regional reconstruction of the initial state on a subregion, with positive lebesgue measure, of the evolution domain, the first being the direct approach and the second is the analytical approach where we suppose that the dynamic of a the system is an infinitesimal generator of an analytical semigroup. The two approaches are based on fixed point techniques.

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On the Regional Controllability of Time-Fractional Semi-linear systems.

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Abstract
The regional controllability of distributed systems is a concept of control theory, developed by El Jai, Simon, Zerrik and Pritchard [1,2], a large number of publications have been made about this concept for linear and nonlinear systems of integer order [3-5]. Recently a lot of mathematicians got interested in the so called "Fractional Calculus" and its applications in control theory [6] in particular regional controllability in the linear case [7,8]. The purpose of this communications is to extend the results of the linear case of time-fractional diffusion systems to the semi-linear case, precisely Hilbert Uniqueness method (HUM) using a fixed point theorem.

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Stabilization of coupled systems

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Abstract

The purpose of this article is to characterize the stabilization of some coupled systems. We give a sufficient condition for exponential stability using a bilinear control. The specificity of the control used is that it only acts on the first equation. In the case where there is no exponential stability, we give a sufficient condition for weak stability. Finally, an application for coupled wave equations is presented.

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Robust tracking and observer design for a class of non linear discrete-time systems

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Abstract
In this paper, the problem of robust tracking and model following is considered for a class of discrete-time nonlinear systems, where nonliearities satisfy the Lipschitz condition. In this paper, it is assumed that the system state is not accessible. A nonlinear observer is designed firstly, and then based on the observed states the controller is designed. Based on Lyapunov stability theory, we prove that the constructed controller can drive the output function of the system to a desired output generated by a reference model, and the tracking error decreases asymptotically to zero. Simulations on controlling systems are investigated, and the results show that the designed controllers are feasible and efficient.

Keywords
Robust tracking, lyapunov stability, model following, observer design, simulations

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Output controllability of positive discrete linear switched systems

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Abstract

In the last 10 years, many studies concern switched positive systems because of its importance in several fields such as bioengineering, economic modeling, behavioral science, and stochastic processes.
Initially, the focus was on the study and analysis of stability and stabilizability properties [1-3], As a result of research, a lot of mathematical problems have been examined, including structural properties such as reachability, controllability and observability. The authors of [2-7] provided controllability and reachability criteria for discrete and continuous time positive linear switched systems.
In this communication, we present an output controllability and output reachability properties for discrete-time positive switched systems. Also, we focus on the necessary conditions for output monomial reachability and null output controllability.

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A study on ship automatic berthing using optimal control and artificial neural networks

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Abstract

Automatic berthing has been known as one of the most difficult problems in ship control, since berthing operation could be characterized by the following: reduction of controllability at low speed, complicated and nonlinear differential equations of motion, effect of environmental disturbances and other problems. To ensure a safe and appropriate berthing maneuver, a new concept named 'virtual window', which consists of changing ship position as well as ship heading, has been introduced using Optimal Control and Artificial Neural Networks. By taking the calculated rudder as proposed by the optimal method, it is guaranteed for each ship, with different heading and from desired starting point of that window, to reach the so-called imaginary line well ahead as well as to ensure minimum time maneuver. After merging to the imaginary line, the ship is commanded to go straight along the imaginary line. In order to do that appropriately, a modified version of PID (proportional-integral-derivative) controller is chosen to deal with it. Such controller can correct not only ship heading, but also the distance between the ship's CG (centre of gravity) and the imaginary line.

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Gradient controllability for Hyperbolics Systems : Theoretical approach

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Abstract
The present talk aims to extend the notion of regional controllability of the gradient from linear systems to the semi-linear hyperbolic case, in order to determination of a control achieving internal regional controllability in a sub-region ω of the domain evolution Ω. The approach is based on an extension of the Hilbert Uniqueness Method (HUM) and Schauder's fixed point theorem.

Keywords: Distributed systems, fixed point, regional gradient controllability.

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Null controllability of a degenerate parabolic equation with one finite delay

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Abstract

We are concerned about the null-controllability of a linear degenerate parabolic equation with one delay parameter on the line (0,1), where the control force is exerted on a subdomain ω of (0,1).

$$\begin{cases} y_t = (a(x)y_x)_x + b(t)y + c(t)y(t-h) + 1_\omega u(t) \ \text{on} Q \\ \mathbf{C}y = 0 \text{on} \quad \Sigma \\ y(0,\cdot) = y_0 \text{in} \quad (0,1) \\ y = \Theta \text{in} \quad (0,1)_{-h} \end{cases} \tag{1}$$

where $(0,1)_{-h} = (-h,0) \times (0,1)$, 1_ω is the characteristic function of an open set $\omega \subset (0,1)$, $b, c \in L^\infty(0,1)$, $y_0 \in L^2(0,1)$, $\Theta \in L^2((0,1)_{-h})$ and $u \in L^2(Q)$. The function a is a diffusion coefficient which degenerates at 0 (i.e., $a(0) = 0$).

For that we show how Carleman estimate can be used to establish the following controllability result : *Let* $T > 0$. *Assume that* $b, c \in L^\infty(Q)$ *and*

$$\lim_{t \to T^-} (T-t)^4 \ln \| c(t) \|_{(0,1)\setminus\overline{\omega}} = -\infty. \tag{2}$$

Then, for any $(y_0, \theta) \in M_2 = L^2(0,1) \times L^2((0,1)_{-h})$, there exists $u \in L^2((0,T) \times \omega)$ such that the associated solution of (1) satisfies $y(T) = 0$ in (0,1). Moreover, the control u can be chosen such that

$$\| u \|_{L^2((0,T)\times\omega)} \leq C_T \| (y_0, \theta) \|_{M_2} \tag{3}$$

for a positive constant C_T depending only on T and ω.

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ABSTRACTS

SESSION III : BIOMATHEMATICS

An HIV within Host Model Controlled

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Abstract

The optimal control policy for an HIV-1 infection model where healthy cells follow a simple logistic growth is formulated and solved as an optimal control problem. Numerical simulations are performed to compare several cases, representing a treatment by Interleukin2 alone, classical treatment by multitherapy drugs alone, then both treatments at the same time. Objective functionals aim to 1/ minimize infected cells quantity, 2/ minimize free virus particles number and 3/ maximize healthy cells density in the blood.

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Stochastic analysis of a SIRI epidemic model with Beddington-DeAngelis incidence rate and relapse

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Abstract

In this paper, we study a SIRI stochastic epidemic model with Beddington-DeAngelis incidence rate and relapse. We establish the uniqueness of the positive solution and we investigate the dynamic properties of the solution around both disease-free and endemic equilibria points of deterministic model. Furthermore, we present some numerical results to support the theoretical work.

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1st International Conference on Research in Applied Mathematics and Computer Science
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Nonlinear parabolic equations with singular function with respect to the unknown

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Abstract
In this paper we introduce a notion of renormalized solution for nonlinear parabolic problems whose model is

$$\frac{\partial u}{\partial t} - div(a(u)\nabla u) + H(x,t,u) = f \qquad in\ Q,$$

where the real-valued function a is assumed to be continuous and increasing function defined on $[0,m[$, such that

$$0 < \alpha < a(s) \quad \forall s \in [0,m[; \qquad \lim_{s\to m^-} a(s) = +\infty \quad and \int_0^m a(s)ds < +\infty,$$

where m is a positive real number. The function $H(x,t,s,\xi)$ is a Carathéodory on $Q \times [0,m[\times \mathbb{R}^N$ with values in $\mathbb{R}^+$ and f is a nonnegative function in $L^1(Q)$.

Keywords: Nonlinear parabolic equations, singular function, renormalized solutions.

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The impact of fluid pressure in active cochlear model

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Abstract

Many diseases are responsible of hearing loss and can lead to abnormalities or damage inside the structure of ear [1]. For example, an increase of cochlear pressure can result a dysfunction of the ear [2]. In reality, to understand the changes observed caused by this increasing are very complicated, for this, mathematical model is developed in order to analyze and study this abnormality. In the latest searches [3], numerical simulations remain a very important tool in the study of the mathematical problems of the cochlea [4-6]. In this present paper, we developed a mathematical model in order to establish the relationship between the fluid pressure and the amplitude of displacement of the Basilar Membrane in a micromechanical model, including the feed-forward/feed-backward mechanisms of the outer hair cell force amplification.

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Identification of breast cancer classes by latent class models

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Abstract
The correct diagnosis of breast cancer is one of the major problems in the medical field. It has been found different pattern recognition techniques that can be help to improve in this domain. These techniques can help the specialists in the field of medicine form a second opinion and make a better diagnosis. In this paper we present a novel classification approach to identify breast cancer, this approach is based on Latent class analysis. Two data set will be compared to improve our results.

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An epidemic model with specific nonlinear incidence rate and random fluctuations.

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Abstract
new stochastic SIR epidemic model with vaccination is proposed and analyzed. First, we show that the model is biologically well-posed by proving the global existence, positivity of solutions. Moreover, sufficient conditions for extinction and persistence of disease are obtained. In the end, some numerical simulations are presented to illustrate our analytical results.

Keywords : SIR epidemic model, , vaccination, SDE, Extinction, Persistence.

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Construction of Lyapunov functionals for fractional differential equations in biology

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Abstract
Mathematical models using ordinary differential equations have been proven valuable to understand the interactions and the evolution of different biological phenomena's. However, this models ignore the memory effect and long-range interactions which exists in most biological systems. For this reasons, fractional differential equations are more accurate to model such real process.
As well known, the stability analysis is an important performance metric for any dynamical system. The fractional-order extension of Lyapunov direct method is becomes one of main interest technique to study the global behavior of fractional order models without solving explicitly such systems. This method provides a way to determinate asymptotic stability by constructing a suitable Lyapunov functions which are not easy to find. Here, a new lemma for Caputo fractional derivative of some functions is presented. The approach in this work, is to construct Lyapunov functionals for FDEs using Lyapunov functionals for ODEs. This result is useful to determine the asymptotic stability of fractional order systems in biology.

Keywords
Caputo fractional derivative, fractional differential equations, Lyapunov fonctions, stability.

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La nouvelle modélisation et contrôle de la propagation spatiale des épidémies: Le modèle multi-régional SI à temps discret

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Résumé

Certaines épidémies se propagent à une large échelle géographique et pour des périodes de temps sans précédent, si les autorités sanitaires ne se pressent pas pour sauver les populations susceptible. Dans tels cas, les modèles mathématiques doivent prendre en compte l'aspect spatial de la propagation de l'épidémie. Les personnes infectées sont impliquées dans la transmission de l'infection d'une personne à une autre et représentent le groupe de population qui doit être contrôlé rapidement. Sur la base de ces hypothèses et en tenant compte de leur facteur de mouvement, nous concevons un modèle Susceptibles-Infectés (SI) qui décrit la propagation spatiale d'une épidémie dans des zones liées avec tout type de mouvement. De plus, nous introduisons des variables de contrôle qui limitent le mouvement des personnes infectées pour éviter le contact avec les susceptibles. Explicitement, nous présentons les régions par des cellules regroupées dans une grille et recherchons des valeurs optimales pour les contrôles en utilisant une version discrète du principe du maximum de Pontryagin. Dans le premier cas, nous cherchons à contrôler une seule cellule en réduisant le mouvement des personnes infectées de ses voisins, et dans un second cas, nous visons à contrôler un groupe de cellules ou de patchs, basé sur la même logique d'interventions, et qui est liée à la stratégie de contrôle optimal du blocage du déplacement de voisinage.

Mots clé :

Propagation spatiale des épidémies• Modèle discret • Le modèle SI • Multi-régions • Contrôle optimal

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Global stability analysis and clinical implications of a modified HIV model with CTL response

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Abstract

A modified mathematical model of the Human Immunodeficiency Virus (HIV) pathogenesis with cytotoxic T lymphocytes (CTL) is introduced in this paper. This model includes a saturated rate function describing the viral infection. It is shown that the disease free steady state is locally asymptotically stable when the virus basic reproduction number is less than one. The existence of two other infection equilibria is established when the virus basic reproduction number is greater than one. The global stability of these endemic equilibria depends on the basic reproduction number and a CTL immune response reproduction indicator. Numerical simulations are performed to illustrate the behavior of solutions and the effectiveness of CTL cells. Moreover, a comparison of the model fitting with some clinical data sets and its implications are also presented.

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Insulin Control of the Glucose-Insulin System: Type 1 Diabetes

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Abstract
Diabetes is a disease that is characterized by excessive glucose in the blood stream. Type 1 diabetes is a chronic illness where the cells in the pancreas that make insulin are destroyed, and the body is no longer able to produce insulin. Patients with type 1 diabetes require lifelong insulin therapy. Most require two or more injections of insulin daily, with doses adjusted based on self-monitoring of glucose levels. 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. 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.

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Association des groupes sanguins ABO et rhésus avec le diabète de type 2

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Résumé

Plusieurs études ont montré qu'il existe une association entre le groupe sanguin ABO et certaines maladies. L'objectifs de cette étude et de déterminer la relation entre les groupes sanguins ABO / rhésus (Rh) et le diabète de type 2. Pour cela nous avons mené une étude cas-témoins impliquant 257 patients diabétiques suivis au service d'hygiène et 266 témoins suivi à l'hôpital Sidi Othmane. L'analyse statistique a été réalisée sur les données obtenues à l'aide du logiciel SPSS 23. Un résultat est usuellement considéré comme statistiquement significatif si p <0,05. 523 sujets ont été inclus dans cette étude, dont 71,2% sont des femmes, l'âge moyen est de 50,62 ± 14,93 ans. La moyenne des glycémies à jeun était de 1,57 ± 0,78 chez les sujets diabétiques et de 1,01±0,11g/l chez les témoins. Les résultats ont montré que les diabétiques présentaient une prévalence moins importante des groupes sanguins A, B, et AB par rapport aux témoins respectivement : A (45,7% vs 54,3%), AB (47,1% vs 52,9), B (42,5% vs 57,5%). Alors que le groupe sanguin O était plus prépondérant chez les diabétiques (54,2% vs 45,8%). Dans notre population, les sujets Rhésus positif sont mieux représentés que les Rhésus négatifs (94,4% de la population témoin et 91,1% de la population diabétique). Une différence significative de la distribution du groupe sanguin O et non-O entre les diabétiques et les témoins à été observée (r= 0,093 ; p = 0,034; OR=1,452 ; IC=1,027-2,051), avec un effet protecteur pour le groupe sanguin O (OR= 0,861 ; IC= 0,676-0,986) et un effet péjoratif pour les groupes sanguins non-O (OR= 1,185 ; IC= 1,185-1,388). Par ailleurs, aucune association n'a été observée entre le diabète et le facteur Rhésus (p=0,098), ni entre le diabète et les groupes non-O (p=0,308). Ce travail a révélé une légère association significative entre le groupe sanguin O et le diabète. Néanmoins, il serait appréciable d'agrandir la taille de l'échantillon pour avoir des résultats plus robustes.

Mots clés: Diabète, groupe sanguin ABO, rhésus.

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Delayed epidemic model in periodic environment

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Abstract

Threshold dynamics of epidemic models in periodic environments attract more attention [3,4]. But there are few papers which are concerned with the case where infected compartments satisfy a delay differential equation [3]. For this reason, we investigate the dynamical behavior of SIR model with delay in periodic environment. We first show the new formulation of a delayed SIR epidemic model where we introduce a latent period into susceptible and infectious individuals in incidence rate [1,2], and then introduce the basic reproduction number R_0 for a delayedSIR model in periodic environment [3,5,6].

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Stochastic analysis of an epidemic model with cure, relapse and general incidence rate

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Abstract

In this paper, we consider a stochastic epidemic model with relapse, cure and a non-linear incidence rate function. We prove the existence and uniqueness of a global positive solution. Then, We show the extinction of the disease under sufficient conditions. The persistence in mean of the epidemic is also established. Numerical simulations are presented to illustrate the theoretical results.

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Dynamic Behavior and Numerical Results for an SIR Epidemic Model with Distributed Delay, Vaccination and Treatment

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Abstract

In this work, we study the global dynamics of an SIR epidemic model with a wide class of generalized nonlinear incidence rate, distributed delay, vaccination and treatment. By constructing a Lyapunov functionals, we show that the disease free equilibrium state is globally asymptotically stable when the basic reproduction number R_0 is less than or equal to one, and that the disease endemic equilibrium is globally asymptotically stable when R_0 is greater than one. We provide numerical results to illustrate the effect of vaccination and treatment on our model.

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Analysis of an HIV Model with Logistic Growth and Infected Cells in Eclipse Stage

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Abstract
In this paper, we study a mathematical model of human immunodeficiency virus dynamics with logistic growth and infected cells in eclipse phase. This model describes the interactions between uninfected CD4+ T cells, infected CD4+ T cells in latent stage, productively infected CD4+ T cells and free virus. The positivity and boundedness of solutions for non negative initial data are proved. The stability of disease-free equilibrium and endemic equilibrium are rigorously established. Numerical simulations are also provided to give a more complete representation of the system dynamics.

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Stability analysis of a fractional SIR epidemic model with nonlinear incidence rate via modified Riemann-Liouville derivative

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Abstract
In this work, we study the dynamics of a fractional SIR epidemic model with nonlinear incidence rate via the modified Riemann-Liouville derivative, which provide a framework for a fractional calculus which is quite parallel with the classical one, this modified fractional derivative applies to functions fractional differentiable but not necessarily differentiable. First, we prove the global existence of solutions, their positivity and boundedness. The disease-free equilibrium and the endemic equilibrium are calculated and their stability is investigated. Finally, numerical simulation are presented to illustrate our theoretical results.

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1st International Conference on Research in Applied Mathematics and Computer Science
ICRAMCS 2019

A threshold of a delayed stochastic epidemic model with Crowly-Martin functional response and vaccination

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Abstract
In this paper, we study a delayed stochastic SIR epidemic model with Crowly–Martin functional response and vaccination. First we prove the existence and the uniqueness of the positive solution. Therefore, we establish a stochastic threshold as a sufficient condition for the extinction and persistence in mean of the stochastic epidemic system. Finally, numerical simulations are presented to support our theoretical results.

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Asynchronous exponential growth of solutions of an age structured cell cycle model with checkpoints

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Abstract

An age-structured PDE model of the cell division cycle within a population of cells in a common tissue controlled by many complex regulatory networks is analysed.
The analysis of the model is based on using the theory developed for the class of translation semigroups that are associated with a core operator ϕ and are solutions of equations of the type $m(t)=\phi(m_t)$. The operator ϕ associated with the model is determined and compactness and spectral properties are established to conclude the asynchronous exponential growth property for the model and the characterization of associated Malthusian coefficient by only using properties of ϕ.

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Système d'équations paraboliques linéaires du type : température et densité de vapeur avec l'effet de l'évaporation

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Résumé

Dans cet exposé nous présentons le résultat obtenu dans [1]. Plus précisément, nous considérons le système de deux équations paraboliques linéaires, une pour la fonction inconnue représentant la température et une pour la fonction inconnue représentant la densité de la vapeur. Le domaine de la fonction représentant la température est { - b < x_3 < a }, tandis que celui de la fonction représentant la densité de la vapeur est { 0 < x_3 < a }, c'est-à-dire la température est définie dans l'eau { - b < x_3 < 0 } et dans l'air { 0 < x_3 < a }, tandis que la densité de la vapeur est définie seulement dans l'air. Les deux équations sont couplées par la quantité de l'évaporation déterminée par le gradient de la densité de la vapeur (la densité de la vapeur au niveau x_3 = 0 est déterminée par la température) et par la chaleur latente due à l'évaporation. Cette source (négative) de la chaleur est concentrée sur le plan { x_3 = 0 }, ce qui nous empêche d'avoir une régularité commode de la solution. En outre le coefficient de la conductivité thermique et la chaleur spécifiques sont différentes dans l'eau et dans l'air. Pour surmonter la difficulté due à ces conditions, outre la linéarisation et une certaine approximation nécessaire, nous introduisons une série de Fourier particulière. L'étude des propriétés précises des fonctions de base de cette série de Fourier nous permet de démontrer l'existence et l'unicité de la solution. Pour exprimer la solution, nous utilisons des espaces de Sobolev particuliers définis en utilisant cette série de Fourier.

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Statistical inverse problem and its application to health data

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Abstract

Regression modelling is a powerful statistical tool often used in clinical trials and epidemiological studies. In this presentation, we formulate the estimates of the regression problem as a solution of the statistical inverse problem [1] that measures the discrepancy between the target outcome and the data produced by representation of the modelled predictors. This approach could simultaneously perform variable selection and coefficient estimation. Inspired by Huber's robust statistics framework, we propose an extension to l1-penalized [2] regression problem.

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Modélisation bioéconomique des équilibres Multi-espèces avec interactions éco-systémiques et de marché

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Résumé :

La croissance et la multiplication des demandes nutritionnelles des clients dans les marchés mondiaux et locaux, ainsi que la préservation des ressources naturelles, amènent les chercheurs à étudier les méthodes convenables d'exploitation de ces ressources, en étudiant les différents indicateurs influençant les équilibres écologique et économique, dont les ressources halieutiques seront le focal de cette étude. La modélisation mathématique est un biais qui permet de comprendre et de prévoir les différents états et interactions des variables influençant ces équilibres, dont ces variables doivent être définies dans les modèles déterministes, alors que les modèles stochastiques permettent de représenter une évolution selon une variable aléatoire. La chaine de MARKOV étant un modèle stochastique qui décrit une séquence d'événements possibles dans laquelle la probabilité de chaque événement dépend uniquement de l'état atteint lors de l'événement précédent, est un processus intéressant à étudier la faisabilité de sa projection sur les modèles bioéconomiques.

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Analysis and control of mathematical model in diabete

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Abstract
Worldwide, diabetes is affecting 370 million people, causing nearly five million deaths and absorbing more than 471 billion USD per year. In this work we study the mathematical model have been developed in diabete to simulate, analyse and understand the dynamics of β-cells, insulin and glucose.,Our objective in this work is to find the best strategy to reduce the concentration of glucose to best normal concentation between 0.7g/l and 1.1g/l, We use a control strategies that diabetics do physical activity and diet, The Pontryagin's maximum principle is used to characterize the optimal control. The numerical simulation is carried out using MATLAB. Consequently, the obtained results confirm the performance of the optimization strategy.

Keywords :
Type 2 Diabetes, Mathematical Modelling, Physiological Equilibrium, Pathological Equilibrium

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Dynamics and Periodic Solutions of Delayed Aedes Aegypti Model

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Abstract
Aedes aegypti (Ae. aegypti: mosquito) is a known vector of several viruses including yellow fever, dengue, chikungunya and zika. In the current paper, we present a delayed mathematical model describing the dynamics of Ae. aegypti. Our model is governed by a system of three delay differential equations modeling the interactions between three compartments of the Ae. aegypti life cycle (females, eggs and pupae). By using time delay as a parameter of bifurcation, we prove stability/switch stability of the possible equilibrium points and the existence of bifurcating branch of small amplitude periodic solutions when time delay crosses some critical value. We establish an algorithm determining the direction of bifurcation and stability of bifurcating periodic solutions. In the end, some numerical simulations are carried out to support theoretical results.

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Analysis of the micromechanics cochlear partition model

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Abstract

In this study, we develop the active micromechanics model of the cochlea in order to describe mathematically the displacement of cochlear partition, then we study the effect of stiffness on the response of the basilar membrane (BM). As a result, the decrease of the maximum displacement of the Basilar membrane was observed and presented numerically, these observations contribute to understand that the mechanism of hearing loss may be the result of altered cochlear micromechanics.

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The stock assessment of aristeus antennatus between a protected fishing area and a free access area.

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Abstract

In this work we describe a model of the interaction between the aristeus antennatus and sardine fish population in a fishing protected area and a free access fishing zone ([1], [2]). We assume that the growth of the population under pre reserve conditions follows the logistic model. The marine reserve is fully protected from fishing and if the shrimps are not in the protected region they are exploitable. The objective of the paper is studying the existence and the stability of the equilibrium points by using eigenvalues analysis ([3], [4]). The importance of marine reserve is analyzed through the obtained results of the numerical simulations of proposed model ([5], [6]).

Keywords: Prey-predator model; Sustainable management of the resources; protected fishing area, free access fishing zone, aristeus antennatus population.

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On reaction-diffusion prey-predator model with Holling response functional and prey refuge

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Abstract

In this paper, we have made an attempt to understand the behavior of a reaction-diffusion Lotka–Volterra type of prey-predator model with Holling type III functional responses incorporating prey refuge protecting (mx) of the prey (x), where m is in [0,1). We have contributed the global existence and boundedness of the solution for the spatial model for each positive initial value. Moreover, we have carried out the stability analysis of both the located model (non-spatial model without diffusive spreading) and of the spatial model.

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A fractional order epidemic model with nonmonotone incidence rate

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Abstract: In this work, we present a fractional order SIR epidemic model with nonmonotone incidence rate. Firstly, We establish the uniqueness of the global positive solution. Then we calculate the equilibria and investigate their stability. Finally, we present some numerical results to support the analytical results.

Key words: SIR epidemic model; psychological effects; Caputo fractional derivative; Stability.

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On the derivation of macroscopic hyperbolic equations: Asymptotic limits and computing

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Abstract
This presentation deals with the analysis of the asymptotic limit toward the derivation of macroscopic equations for a class of equations modeling complex multicellular systems by methods of the kinetic theory. After having chosen an appropriate scaling of time and space, a Chapman–Enskog expansion is combined with a closed, by minimization, technique to derive hyperbolic models at the macroscopic level. The resulting macroscopic equations show how the macroscopic tissue behavior can be described by hyperbolic systems, which seem the most natural in this context. We propose also an asymptotic preserving well-balanced scheme for the one-dimensional hyperbolic model, in the two-dimensional case, we consider a time-splitting method between the conservative part and the source term where the conservative equation is approximated by the Lax-Friedrichs scheme.

Keywords
Kinetic theory; multicellular systems; hyperbolic limits; chemotaxis; asymptotic-preserving scheme; Lax–Friedrichs flux.

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Fishing effort dedicated to exploit small pelagic species in Morocco

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Abstract

Morocco has an important fishing heritage, with its two maritime facades, Mediterranean and Atlantic. Since there has been a decline in national marine and coastal biodiversity, this paper proposes a case study of five small pelagic species: sardine, sardinella, anchovy, mackerel and horse mackerel exploited by seiners in the maritime zones of Morocco. A comparison is made between the fishing effort that we determine using the generalized Nash equilibrium problem and the actual fishing effort given by the National Institute of Fisheries Research. In this work, fishing effort represents the number of fishing trips that must be made by seiners and that allows them to maximize their gain taking into account the preservation of five species. As a result, we find that master data of the National Institute of Fisheries Research support the outcomes shown in the end of this paper.

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The θ-deformed sl_4-KdV hierarchy in the framework of Moyal momentum algebra

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Abstract

We establish in this communication the noncommutative $sl4$ -KdV hierarchy in Moyal momentum language. The obtained results are shown to be compatible with the ones already established in literature for the commutative case. Some computations related to the dressing gauge group of the subspace $sl4$ - $\hat{\Sigma}_4^{(0,4)}$ are explicitly presented.

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Courbe de direction evolute de l'indicatrice normale d'une courbe régulière

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Résumé

Dans la théorie des courbes, certaines courbes régulières sont obtenues moyennant des relations géométriques et différentielles les liant à d'autres courbes régulières, dites courbes associatives. Parmi les plus étudiées, on trouve les courbes evolutes, les courbes de Bertrand, les courbes de Mannheim et les indicatrices sphériques. Dans ce travail, on donne une nouvelle approche à la courbe evolute d'une courbe régulière en se basant sur les courbes de direction.

En notant par N l'indicatrice de la normale, d'une courbe régulière donnée. On considère une X-courbe de direction, où X est une combinaison linéaire des vecteurs de Frenet de N. En supposant de plus que la X-courbe de direction est evolute de N, on obtient des relations liant leurs invariants de frenet respectifs.

Moyennant ces résultats sur les courbes associatives, on donne une nouvelle approche pour construire les hélices générales, obliques, c-obliques… Et on termine ce travail par des illustrations de certains cas.

Mots clés: courbes associatives, courbes de direction, courbe evolute, hélices obliques, hélices C-obliques

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vecteur position des hélices k-obliques

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Abstract

Certaines courbes régulières sont définies par des propriétés géométriques et on désire les caractériser pour en déduire leurs paramétrisations.

Dans ce travail, on s'intéresse aux hélices k-obliques. Il s'agit de courbes régulières de classe C^∞ de courbure et de torsion non nulles dont le vecteur C_k garde un angle constant avec une direction fixe, où

$C_1 = N'/\text{II } N' \text{ II}$, N est la normale principale,
$C_k = C'_k / \text{II } C'_k \text{ II}$ avec $(k \geq 2)$.

Plus particulièrement, on se propose de déterminer leur vecteur position dans un repère fixe. Pour cela, on considère les repères orthonormés directs

$$R_{k-1} = (C_{k-1}, C_k, W_k).$$

Où $W_k = C_{k-1} \wedge C_k$, et moyennant les formules liées à ce repère, on établit une équation différentielle satisfaite par le vecteur C_k. On remarquera que la résolution de cette équation n'est pas toujours facile, néanmoins sa résolution permet d'obtenir le vecteur C_k d'une courbe régulière et d'en déduire par la suite la paramétrisation de la courbe.

En tenant compte de l'équation différentielle satisfaite par le vecteur C_k et d'une caractérisation établie pour l'hélice k-oblique, on peut déterminer son vecteur position.

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On k-spectrally monomorphic Hermitian matrices

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Abstract

Let H be an n by n Hermitian matrix and let X , Y be two nonempty subsets of $[n]$ (where $[n] = \{1,2, \ldots \ldots, n\}$). We denote by $H[X]$ the principal submatrix of H, having row and column indices in X. We say that H is k-monomorphic if all its principal submatrices of order k are isomorphic. In other words, for any subsets X and Y such that $|X| = |X| = k$, there is a permutation matrix P satisfies $P^{-1}H[X]P = H[Y]$. A Hermitian matrix is k-spectrally monomorphic if all its principal submatrices of order k have the same characteristic polynomials. A k-monomorphic Hermitian matrix is k-spectrally monomorphic. In this paper, we study the class of where is k-spectrally monomorphic Hermitian Matrices.

Keywords: Principal minor, i-representation of a tournament, i-representation of a Hadamard tournament.

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Almost Hermitian Golden Structures

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Abstract

The notion of Golden manifold M was defined by Crasmareanu and Hretecanu in [2] by a tensor field Φ on M satisfying $\Phi^2 = \Phi + I$ where I is the identity transformation. The authors studied some properties of this manifold and they have showed that Φ is an automorphism of the tangent bundle TM and its eigenvalues are $\phi = \frac{1+\sqrt{5}}{2}$ and $\phi^* = 1 - \phi$. There are also several recent works in this direction. And in the same article [2], they introduced the notion of complex Golden structure as a tensor Φ_c fo type (1, 1) satisfies $\Phi_c^2 = \Phi_c - \frac{3}{2} I$ and its eigenvalues are $\phi = \frac{1+i\sqrt{5}}{2}$ and $\phi^* = 1 - \phi$, where $i^2 = -1$.

In this talk, rely on the relationship between the almost complex structure J and the almost complex Golden structure Φ_c given in [2], we extract the geometric tools for the *almost Hermitian Golden structure* (Φ_c, g) where g is a Riemannian metric on M and we use them to define certain new classes. We give a concrete examples.

Keywords: Golden manifold, complex Golden structure, almost complex structure.

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A Note on Hamming distance of linear codes over a finite chain ring

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Abstract
Let ***R*** be a finite chain ring , ***K*** its residue field, and ***C*** a linear code over ***R***. We study ***d(C),*** the Hamming distance of ***C.***

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New bounds for the numerical radius of a matrix

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Abstract

The numerical range of a square complex matrix A plays an important role in different fields of contemporary mathematics, including numerical linear Algebra, operator theory, numerical analysis, matrix analysis, fluid dynamics and other.

Using the numerical range we can localize the eigenvalues of A. The most related concept is the numerical radius of A, which is a quantity defined as the largest absolute value of the numbers in the numerical range. In this paper we exhibit new bounds of the numerical radius using the entries of the matrix A itself.

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Modeling and development a Geomatics solution for the Management of Drinking water in Urban Group Ben M'sik of Greater Casablanca using Lizmap

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Abstract

This work consists in modeling the drinking water network in the urban group Ben M'sik of Grand Casablanca, in seeking an approach to the management of this last through powerful tools that are the geographic information systems (GIS), and modernizing the management of drinking water networks by development a Geomatics solution using lizmap, The quantitative importance of drinking water network data, gave birth a lot of ideas of using of geographic information systems, which gave a great impetus and efficiency to the management of these networks and which return our city Casablanca in among smart cities by using these kinds of applications. A methodological approach was adopted to develop a geographical information system of drinking water network, this approach is based to modelized this last. With an open source CASE tool, the ArgoCASEGEO, and its modular architecture. The ArgoCASEGEO tool allows the modelling of geographic database based on the UML-GeoFrame conceptual model that is specific for applications of Geographic Information Systems (GIS). The results of this modeling allow us to build a descriptive, and geographical database necessary to schematize and parameterize information relating to drinking water network equipment's. In this context, we have developed modeling diagrams. In this context, we have developed conceptual models' diagrams in order to develop our application via Lizmap. a Cartographic web application made by 3Liz in the GIS is prepared with QGIS2.18.19 desktop software and the data transfer are made by FTP protocol in order to publish our application at the cartographic server QGIS SERVER.

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The finiteness of the ring of constants problem

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Abstract
Let k be a field of characteristic zero and let A=k[x1,...,xn] be the polynomial ring over k, let d be a locally nilpotent k-derivation of A. An element a of A is said to be principal if d(a)=0. If d has no principal elements then the problem of the finiteness of ker(d) is difficult. In this work we present the algorithm of A. van den Essen, based on the theory of Gröbner bases which seems to be useful of a solution of this problem.

Key words: Derivation, Polynomial ring, ring of constants.

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Special Ruled Surface with Frenet Frame in Euclidean 3-Space

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Abstract

In differential geometry of curves and surfaces [4], a ruled surface represents one of the most fascinating topics in surface theory, it is defined by choosing a curve which called base curve and a line along that curve (ruling). An important number of researchers in many papers have studied one of the moving frames of its base curve. In this paper, we consider Striction curve of a non-cylindrical ruled surface as base curve of the ruled surface whose rulings are linear combinations of Frenet frame vectors of the first ruled surface. We investigate the most important characteristic properties of the new ruled surface such as the Gaussian curvature, the mean curvature in general case. Moreover, we obtain some characterizations in some special cases

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Introduction aux Inégalités Variationnelles

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Résumé :

Dans cette communication nous allons donner une introduction au problème d'inégalité variationnelle, VIP(F,S), où F est une fonction définie de $\mathbb{R}^n$ vers $\mathbb{R}^n$ et S est un ensemble convexe non vide de $\mathbb{R}^n$, et qui consiste à chercher $x^* \in S$ verifie l'inégalité suivante :

$$x^* \in S, \qquad < F(x^*), x^* - x >\leq 0 \quad pour\ tout\ x \in S$$

Ce problème représente un cadre général d'un certain nombre de problèmes classiques tels que (a) la recherche d'un zéro d'une fonction; (b) la recherche d'un point stationnaire d'un problème d'optimisation; (a) la recherche des solutions des problèmes de complémentarités; etc.

Plus précisément, nous allons démontrer les théorèmes suivants :

Théorème 1 : Le problème de l'inégalité variationnelle VIP(F, $\mathbb{R}^+_n$) est complètement équivalent au problème de complémentarité CP(F) :

$$Trouver\ \ \mathbb{R}^n \ni x^* \geq 0\ \ et\ \ F(x^*) \geq 0\ \ tel\ que\ \ < x^*, F(x^*) >= 0$$

Théorème 2 : Le problème de l'inégalité variationnelle VIP(F, $\mathbb{R}^n$) est complètement équivalent à la recherche des zéros de la fonction F sur $\mathbb{R}^n$.

Théorème 3 : Soit S un convexe fermé non vide de $\mathbb{R}^n$, si F est le gradient d'une fonction convexe différentiable f : $\mathbb{R}^n$ --> $\mathbb{R}^n$, alors le problème de l'inégalité variationnelle VIP(F,X) consiste à minimiser la fonction f sur l'ensemble S.

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ABSTRACTS

SESSION IV : FUNCTIONAL ANALYSIS AND FIXED POINT

Frames and Operator Frame In Hilbert A-modules

Mohamed ROSSAFI, Samir KABBAJ
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Abstract

Frames possess many nice properties which make them very useful in wavelet analysis, irregular sampling theory, signal processing and many other fields. In this talk, we present a brief introduction to Frames and Operator Frame in Hilbert A-modules.

Topics that will be discussed include: Frames, Operator Frame and *-Operator Frame in Hilbert A-modules.

We will also study Operator Frame in two Hilbert C*-modules with different C*-algebras.

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Jordan ideals in 3-prime near-rings with left multipliers

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Abstract

The purpose of this paper is to study derivations satisfying certain differential identities on Jordan ideals of 3-prime near-rings. Moreover, we provide examples to show that hypothesis of our results are necessary.

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Existence result for a class of quasilinear elliptic systems under weak monotonicity

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Abstract

In this paper, we prove the existence of weak solutions for a class of quasilinear elliptic systems in the setting of Sobolev spaces. The needed result is shown under weak monotonicity assumptions and the concept of Young measure.

Key words: Quasilinear elliptic system, weak solution, Young measures.

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Frames and Their Generalizations

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Abstract
Frames can be considered as generalized orthonormal bases, and lead to convenient expansions of the elements in the underlying Hilbert space. We will give a some generalization of frames in Hilbert Modules, with focus on their operator theoretical characterizations.

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A Fixed Point Theorems in Banach Algebra with Applications to Functional Integral Equations

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Abstract

Fixed point theory is an important topic and the core part of nonlinear functional analysis and the theories of differential and integral equations. Some of these equations can be formulated into one of nonlinear operator equations

$$x = Ax + Bx,$$
$$x = AxBx + Cx,$$
$$x = AxBx + AxDx + Cx.$$

The resolution of these equations was the main interest of many scientists and there results were very interesting. In this work we get unified results for solving these equations, for this, we introduce new family operators in these equations. As an application, we give an example of a functional nonlinear integral equation. Our results presented in this work improve, extend, generalize, and unify many results existing in [1,2,3].

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Polynomially Riesz elements

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Abstract

Given two complex unitary Banach algebras A and B and an algebra homomorphism $T: A \to B$ An element $a \in A$ is said to be "polynomially T-Riesz" if there exists a non zero complex polynomial P such that $TP(a)$ is a quasi-nilpotent element of B. Our purpose in this talk is to study polynomially Riesz element relative to an arbitrary Banach algebra homomorphism. Mainly, we present sevral properties of polynomially Riesz elements which leading us to give a decomposition to these elements in C^*-algebra.

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Best Proximity Point In A locally Convex Vector Space And Application

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Abstract

In this work, we prove the existence of best proximity points for a relatively nonexpansive mapping and we apply it to get best proximity pairs theorem in a probabilistic normed space.

Main Result:

Definition1: A pair (A, B) of subsets of a Hausdorff locally convex vector space (E, P) is said to be P-proximal if for each $(x, y) \in A \times B$ there exists $(x_0, y_0) \in A \times B$ such that

$$p(x - y_0) = p(x_0 - y) = dist_p(A, B)$$

Definition2: A convex pair (K_1, K_2) of a Hausdorff locally convex vector space (E, P) is said to have P-proximal normal structure if for any closed, bounded, convex proximal pair $(H_1, H_2) \subseteq (K_1, K_2)$ satisfies

(i) $dist_p(H_1, H_2) = dist_p(K_1, K_2)$.

(ii) $\delta_p(H_1, H_2) > dist_p(H_1, H_2)$.

There exists $(x_1, y_1) \in H_1 \times H_2$ such that

$$\delta_p(x_1, H_2) < \delta_p(H_1, H_2)\ ;\ \ \delta_p(x_2, H_1) < \delta_p(H_1, H_2)\ .$$

Theorem1: Let (A, B) be a nonempty weakly compact convex pair in a Hausdorff locally convex topological vector space (E, P) where P is a family of continuous seminorms wich generate the topology on E and suppose (A, B) has P-proximal normal structure. Assume that $T: A \cup B \longrightarrow A \cup B$ satisfies

(i) $T(A) \subseteq B$ and $T(B) \subseteq A$.

(ii) $p(Tx - Ty) \leq p(x - y)$ for $x \in A, y \in B$ and $p \in P$.

Then there exists $(x, y) \in A \times B$ such that

$$p(x - Tx) = p(y - Ty) = dist_p(A, B).$$

Key Words : Best proximity pairs; Locally convex space; Relatively Nonexpansive mapping; P-Proximal normal structure ; Probabilistic normed space.

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THE STABILITY OF N-DIMENSIONAL QUADRATIC FUNCTIONAL INEQUALITY IN NON ARCHIMEDEAN BANACH SPACES

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Abstract:

Over the last three decades, several articles and research monographs graphs have been published on various generalized stability of Hyers-Ulam-Rassias to a number of functions. In the development of what is now known as Hyers-Ulam-Rassias stability of functional equations. A generalization of Rassias 'theorem was obtained by Gavruta in 1994 by replacing the uncommitted Cauchy difference with a control function in the spirit of Rassias' approach. In 2010; Y.J. Cho, C.Park, R.Saadati prove the generalization of Hyers-Ulam stability of the functional inequality associated with the inequality of three variable Cauchy in non-Archimedean Banach spaces. In 2001 Jae-Hyeong Bae proves the stability of N-Dimensional quadratic functional equation in Banach spaces. In this work, we prove the stability of N- Dimensional quadratic inequality in non Archimedean Banach spaces.

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On some nonlinear parabolic equations in Musielak-Orlicz Spaces

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Abstract: We study the existence of solutions for some strongly nonlinear parabolic problem with L^1data in Musielak-Orlicz spaces, assuming only the log-Hölder continuity condition on the Musielak function.

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An introduction to generalized fractional Sobolev Space with variable exponent

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Abstract
In this paper, we extend the fractional Sobolev spaces with variable exponents $W^{s,p(x,y)}$ to include the general fractional case $W^{K,p(x,y)}$, where p is a variable exponent, $s \in (0,1)$ and K is a suitable kernel. We are concerned with some qualitative properties of the space $W^{K,p(x,y)}$ (completeness, reflexivity, separability and density). Moreover, we prove a continuous embedding theorem of these spaces into variable exponent Lebesgue spaces. As an application, we establish the existence and uniqueness of a solution for a non-local problem involving the non-local integro-differential operator of elliptic type.

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Existence of solutions for a nonlocal Kirchhoff type problem in fractional Orlicz-Sobolev spaces

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Abstract
In this paper, we investigate the existence of weak solution for a Kirchhoff type problem driven by a nonlocal operator of elliptic type in a fractional Orlicz-Sobolev space, with homogeneous Dirichlet boundary conditions.

$$\begin{cases} M\left(\int_{\mathbb{R}^{2N}} A([u(x)-u(y)]K(x,y))dxdy\right)\mathcal{L}_A^K u = f(x,u) \ \ in\ \Omega, \\ u = 0 \ \ in \ \ \mathbb{R}^{2N}\setminus\Omega. \end{cases}$$

Where $\mathcal{L}_A^K$ is a nonlocal operator with singular kernel K and A is an N-function, Ω is an open bounded subset in $\mathbb{R}^n$ with Lipschitz boundary $\partial\Omega$.

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Controllability of impulsive semilinear stochastic partial integro-differential equations with delays

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Abstract

In this talk we study the controllability results of semilinear stochastic functional itegro-differential equations with delays driven by fractional Brownian motion in a real separable Hilbert space. The controllability results are obtained using stochastic analysis and a fixed-point strategy. Finally, an illustrative example is provided to demonstrate the effectiveness of the theoretical result.

The subject of stochastic calculus with respect to fractional Brownian motion (fBm) has gained considerable popularity and importance due to its frequent appearance in a wide variety of physical phenomena, such as hydrology, economic, telecommunications and medicine. Many contributions for stochastic calculus with respect to fBm have emerged in the last decades, see[1-7].

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The Nehari manifold for a fractional $(p(.),q(.))$-Laplacian systems

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Abstract
In this paper, we study the existence of multiple positive weak solutions for a quasilinear elliptic system involving the fractional $(p(.),q(.))-$Laplacian operators. The approach is based on the Nehari manifold and on some variational methods.

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Some results on Tricyclic mappings

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Abstract

A tricyclic mapping T is defined on the union of three subsets A,B and C of a metric space, that satisfies T(A)⊆B, T(B)⊆C and T(C)⊆A. Taking inspiration from the recent work by the current authors. We shall discuss existence of best proximity points of both tricyclic contractions and tricyclic relatively nonexpansive mapping in different subclasses of metric spaces. First, we introduce the concept of (S) convex metric spaces, those are convex metric spaces whose convex structure fulfills an additional condition, and thereby we acquire a best proximity point theorem for tricyclic contraction mappings. Afterwards, we study the structure of minimal sets of tricyclic mappings in the setting of Kohlenbach hyperbolic spaces, this way we obtain an existence theorem of a best proximity point for tricyclic relatively nonexpansive mapping.

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A Generalized Sequential Formula for Subdifferentials of Multi-composed Functions Defined on Banach Spaces and Applications

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Abstract

Recently, the sequential approach introduced in [1-5] has received an increasing interest. Indeed, this approach enables us to characterize an optimal solution of a scalar or vector convex programming problems in terms of sequences or nets, without imposing any constraint qualification. In this work, we present a sequential formula for the subdifferential of a multi-composed convex function and as an application, we provide sequential optimality conditions for a general multi-composed optimization problem with geometric and cone constraints, without any qualification condition.

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On some generalizations of K-g-frames

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Abstract
Frames generalize orthonormal bases and allow stable representation of all the elements of the space via a given frame and its dual frame. Frames are not only interesting from theoretical point of view, but play significant role in signal and image processing, which leads to many applications in informatics, engineering, medicine, and many other fields. We investigate the g-frame and Bessel g-sequence related to a linear bounded operator K in Hilbert Module and we establish some results.

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Existence and multiplicity of the solutions of the fractional p(.,.)-Laplacian problem

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Abstract

In this paper, we are interested with the following problem

$$\begin{cases} -M\left(\int \frac{|u(x)-u(y)|^{p(x,y)}}{p(x,y)\,|u(x)-uy|^{N+p(x,y)s}}\,dx\,dy\right)\Delta^{s}_{p(x,y)}u(x) = f(x,u) & in\ \Omega, \\ u = 0 & On\ \partial\Omega, \end{cases}$$

where Ω is a bounded domain in R^N, $N \geq 2$ with smooth boundary $\partial\Omega$, M and f are two continuous functions and the operator$\Delta^{s}_{p(x,y)}u$ is given by

$$\Delta^{s}_{p(x,y)}u(x) = p.v\int \frac{|u(x)-uy|^{p(x,y)-2}(u(x)-u(y))}{|u(x)-uy|^{N+p(x,y)s}}\,dy,$$

where $p.v.$ is a commonly used abbreviation in the principal value sense, $0 < s < 1$, and p is continuous function on Ω with $sp(x;\ y) < N$, and $f : \Omega \times R \to R$ is a continuous function .

By using variational approach and Krasnoselskii′s genus theory, we show the existence and multiplicity of solutions for p(x)-Kirchhoff -type equation.

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Capacity defined in anisotropic Sobolev spaces

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Abstract

Our aim is to study the theory of capacity in an anisotropic Sobolev space $W^{1,\vec{p}}(\Omega)$ with $\vec{p}=(p_1, p_2, \ldots\ldots, p_N)$ and $1 \leq p_1, \ldots\ldots, p_N < \infty$. Let k a positive intégrable function on $\mathbb{R}^N$ and for $X \subset \mathbb{R}^N$ $(N \geq 2)$, we will define the $C_{k,\vec{p}}$ capacity in an anisotropic Sobolev space by $C_{k,\vec{p}}(X) = \inf_{f \in S_{\vec{p}}(X)} ||f||_{W^{1,\vec{p}}(\Omega)}$, where $S_{\vec{p}}(X) = \{f \in W^{1,\vec{p}}(\Omega): k * f \geq 1 \text{ on } X\}$ and prove their main properties, specifically it will be seen that $C_{k,\vec{p}}$ defines a Choquet capacity.

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SOME GENERALISED FIXED POINT THEOREMS IN A PARTIALLY ORDERED SPACE ENDOWED WITH TWO METRICS

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Abstract

In 2008, Suzuki [1] proved a fixed point theorem that is a generalization of the Banach contraction principle and characterizes the metric completeness. In this paper, we use Suzuki-type contractions to prove some fixed point theorems for generalized contraction in an ordered space equipped with two metrics. These theorems are generalizations of fixed point theorem due to Kannan [2]. Our results on partially ordered metric spaces generalize and extend some results of Ran and Reurings [3], Nieto and Rodríguez-López [4].

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Noncyclic mappings and best proximity pair in modular spaces

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Abstract

The notion of modular space, as a generalization of Banach spaces, was introduced by H. Nakano [6] in 1950. After that, many authors studied and developed Nakano's results.

Let A and B two nonempty subsets of a modular space. A mapping $T : A \cup B \to A \cup B$ is said noncyclic if $T(A) \subset A$ and $T(B) \subset B$. If A and B are disjoint, then the fixed point equation $T(x) = x$ does not have a solution. Hence, it is interesting to ask even if possible to find a pair $(p, q) \in A \times B$ such that

$$p = T(p), q = T(q) \text{ and } \rho(p - q) = dist_\rho(A, B) = inf\ \{\rho\ (x\ -\ y) : x\ \in\ A, y\ \in\ B\}$$

The pair (p, q) is called a best proximity pair for the noncyclic mapping T. As an answer to this problem, we refer readers to [1-5].

In this communication, we present an existence result of best proximity pair for noncyclic monotone relatively ρ-nonexpansive mappings in uniformly convex modular spaces, that is a noncyclic mapping $T : A \cup B \to A \cup B$ such that: for all $(x, y) \in (A \cup B)^2$, $x \leq y\ (resp. y \leq x)$ implies $T\ x \leq T\ y\ (resp. T\ y \leq T\ x)$, and $\rho(T\ x - T\ y) \leq \rho(x - y)$ for all $x \in A$ and $y \in B$ comparable.

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Existence de solutions faibles pour un système modélisant le transport polarisé en spin dans des multicouches ferromagnétiques

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Résumé

Un système modélisant le transport polarisé en spin dans des multicouches ferromagnétiques est considéré. Dans ce modèle, l'accumulation de spin est décrite par une équation de diffusion fractionnaire quasi linéaire. Cette équation est couplée à l'équation de Landau-Lifshitz-Gilbert fractionnaire, une équation non linéaire, non locale décrivant la précession de l'aimantation dans les couches ferromagnétiques. L'existence globale de solutions faibles est prouvée.

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Measures of noncompactness and fixed point theory

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Abstract : In this communication, we present measure of noncompactness and their applications in fixed point theory.
The Kuratowski, the Hausdorff and the weakly noncompactness measure are discussed and their properties are compared. We present some results concerning standard measures of noncompactness in different spaces including C([a, b]; R), Lp([a, b]; R). Subsequently, we study different classes of operators, for which we establish fixed point.

Keywords: Fixed point, Measure of noncompactness.

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Un Principe de Sous-suites dans la Théorie des Probabilités

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Abstract

En 1967 Janos Komlós [1] a démontré le fameux théorème qui porte son nom qui affirme l'existence d'une limite presque sûre pour les moyennes arithmétiques d'une suite bornée dans L^1_R. Ce théorème fournit un résultat de compacité relative dans L^1 au sens de la convergence de Césaro presque sure. Parmi ses nombreuses applications, l'une des plus utiles en pratique est la loi forte des grands nombres de Kolmogorove pour les v.a. réelles.

La démonstration proposée initialement par Komlós [1] était assez longue, des démonstrations plus courtes ont été publiées depuis, par exemple par Chatterji [2] dans le cas réel et par Guessous [3] dans le cas Hilbertien. Il y a eu un nombre considérable de travaux généralisant ce théorème dans diverses directions, notamment lorsque les fonctions $(f_n)_{n\geq 1}$ sont à valeurs vectorielles, en dimension finie ou infinie (par exemple [4], [5], [6]) et lorsqu'on permute les termes de la suite $(f_n)_{n\geq 1}$ (par exemple [6], [7]).

Le but de ce travail est de contribuer à la version invariante par permutation du théorème de Komlós.

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Stochastic differential equations for eigenvalues of ε –Wishart process in the G-Framework

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Abstract
In the present paper, we introduce at first a new process called multivariate fractional Brownian motion (B_{t}^{H}) to the setting of non linear G-expectation, where the Hurst parameter H is a diagonal matrix. Then we obtain a system of G-stochastic differential equations of eigenvalues of ε–Wishart process defined from a multivariate G-fractional Brownian motion of its Riemann-Liouville part. Finally, we prove that the eigenvalues never collide at any time.

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Nonlinear Elliptic Equations by Topological Degree in Musielak-Orlicz-Sobolev Spaces

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Abstract

Recently, there has been an increasing interest in the study of elliptic and parabolic mathematical problems in Musielak-Orlicz-Sobolev spaces. This setting includes and generalizes variable exponent, anisotropic and classical Orlicz settings.

The interest brought to the study of such differential equations comes for example from applications to non-Newtonian fluids (see [2, 3] for a wide expository) and other physics phenomena.

Let Ω be a bounded domain in $\mathbb{R}^N$; $N \geq 2$. Let us suppose that the boundary of Ω denoted $\partial\Omega$ is C^1. We consider a class of nonlinear Dirichlet problems of the form:

$$(1) \quad \begin{cases} -\mathrm{div}a_1(x, \nabla u) + a_0(x, u) = f(x, u, \nabla u) & \text{in } \Omega \\ u = 0 & \text{on } \partial\Omega \end{cases}$$

The right-hand side f is a Carathéodory function which a growth condition and where $a_1 : \Omega \times \mathbb{R}^N \to \mathbb{R}^N$ and $a_0 : \Omega \times \mathbb{R} \to \mathbb{R}$ are Carathéodory functions satisfying Leray-Lions-like conditions which generate an operator of the monotone type $-div a_1(x, \nabla u) + a_0(x, u)$ defined on $W_0^1 L_\phi(\Omega)$ with values in its dual $(W_0^1 L_\phi(\Omega))'$. Here ϕ is a Musielak-Orlicz function satisfying some sufficient conditions, namely Δ_2 −condition which assures the reflexivity of such spaces.

Our aim is to prove the existence a weak solution of (1) by using the topological degree theory [1, 4].

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Bounded solutions for some strongly nonlinear elliptic equations with L1-Data

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Abstract

We are interested in existence result concerning the solution in L1(omega) to the nonlinear elliptic problem having nonlinear singular term .

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Positive solutions for a second order multi-point boundary value problem with delay

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Abstract

In this work, we investigate the existence of positive solutions for a second order multi-point boundary value problem with delay. Under certain growth conditions on the nonlinearity, and by the mean of Leray-Schauder fixed point theorem, sufficient conditions for the existence of nontrivial solution are obtained, which improve the results of literature J. Chen and al. [2]

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New Idea of Generalized of Variant of d'Alembert Functional Equation

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Abstract

Let (S, .) be a semigroup and let $\sigma \in \mathrm{Hom}(S,S)$ satisfies $\sigma \circ \sigma = id$ We show that any solution $f: S \to \mathbb{C}$ of the functional equation $\chi_1 f(xy) + \chi_2 f(\sigma(y)x) = 2f(x)f(y),\ x, y \in S$, has the form f= $\frac{\mu+\chi_1\chi_2\mu\circ\sigma}{2}$ where μ is a multiplicative function on S and $\chi_1,\ \chi_2: S \to \mathbb{C}\backslash\{0\}$, be two characters on S such that $\chi_2(x\sigma(x)) = 1,\ x \in S$. In addition, we investigate the solutions of this equation defined on a semigroup and taking valued in a complex Hilbert space with the Hadamard product.

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Three solutions for a (p, q) -Laplacian Steklov problem

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Abstract
In this paper we study the existence of at least three nontrivial solutions for the nonlinear (p,q)-Laplacian problem, with nonlinear boundary conditions. We establish that there exist at least three non-zero solutions. This result extends some of the results known with (p; q)-Laplacian Neuman or Dirichlet boundary conditions on bounded domain (see [1]) and generalize some results known in the p-Laplacian Steklov problems (see [2]).

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Fixed points theorems of nonexpansive mappings and connectedness properties

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Abstract
Recently, many of the standard ideas of nonlinear analysis have been extended to the class of so-called CAT(0) spaces (see [6], [7]). While many of the Banach space ideas carry over to a complete CAT(0) setting without essential change, often a more geometrical approach is required, with less emphasis on topological concepts caused by, among other things, the absence of a weak topology.
There is an interesting class of spaces which are both complete CAT(0) spaces and hyperconvex metric spaces. These are the complete R-trees (or metric trees). Indeed, a CAT(0) space is hyperconvex if and only if it is a complete R-tree.
In this survey we discuss some recent metric fixed point results in some of the settings just described, which have some interesting connections with classical fixed point results in topology.

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Some Generalizations of Kannan's Fixed point Theorem in Complete and Compact Metric Spaces

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Abstract

In this work, we establish a new generalizations of Kannan's fixed point theorem in complete and compact metric spaces under different assumptions like asymptotic regularity, approximate fixed point property and continuity. Further, we give examples to illustrate the main theorems.

Key words: Fixed point, compact metric space, complete metric space, asymptotic regularity, approximate fixed point property.

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Fixed point theorem for p-nonexpansive mapping in locally K-convex space

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Abstract
The founding father of non-Archimedean Functional Analysis was Monna, who wrote a series of papers in 1943 (see [1]). Over the years a wellestablished discipline developed, reflected in the 2000 Mathematics Subject Classifications 46S10 and 47S10 of the Mathematical Reviews. A milestone was reached in 1978 at the publication of van Rooij's book [2], the most extensive treatment on non-Archimedean Banach spaces existing in the literature. In the meantime van Tiel had published his thesis [3] on non-Archimedean locally convex spaces.
In the present paper, we obtain some new fixed point theorems for nonexpansive mappings in the setting of locally K-convex space. Our theorems complement, generalize and extend some well known results of Petalas and Vidalis [A fixed point theorem in non-Archimedean vector spaces, Proc. Amer. Math. Soc 118(1993),

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Measure of Noncompactness and Neutral Functional Differential Equations with State-Dependent Delay

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Abstract

Our aim in this work is to study the existence of solutions of first and second order for neutral functional differential equations with state-dependent delay. We use the M¨onch's fixed point theorem for the existence of solutions and the concept of measures of noncompactness.

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1st International Conference on Research in Applied Mathematics and Computer Science
ICRAMCS 2019

Fixed point results in generalized metric spaces with a graph

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Abstract

We discuss Fisher's fixed point theorem for mappings defined on a generalized metric space endowed with a graph. This work should be seen as a generalization of the classical Fisher's fixed point theorem. It extends some recent works on the extension of Banach contraction principle to generalized metric spaces with graph. Some examples are given to illustrate our results.

Keywords : Fixed point ; Fisher contraction ; generalized metric spaces ; graph.

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ON THE PICARD APPROXIMATION AND FIXED POINT SCHEME FOR SDEs DRIVEN BY G-BROWNIAN MOTION

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Abstract

A significant role is played by stochastic differential equations(SDEs for short) in a broad range of applied disciplines, including biology, economics, finance, chemistry, physics, microelectronics and mechanics ... (for mor details see[2]).

Motivated by uncertainty problems, risk measures and super-hedging in finance, recently Peng [3,4] gives in 2006 the notions of G-expectation and G-Brownian motion on sublinear expectation space which provides the new perspective for the stochastic calculus under uncertainty..As a counterpart in the classical framework, stochastic differential equations driven by G-Brownian motion (G-SDEs for short) have been studied by Gao [1] and Peng [4]. Many interesting works have been done on G-SDEs. Among the theories and applications of G-SDEs, the differentiability is a vital important one. The objective of this paper is to study the differentiability of solution of stochastic differential equations driven by d-dimensional G-Brownian motion with respect to the initial data via a fixed point theory and Picard approximation.

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On Weak-* Césaro Convergence Almost Everywhere

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Abstract

Let (Ω, T, μ) be a complete probability space, E is a Banach space and E' is the topological dual of E. Several authors have been interested in the study of the weak Césaro convergence almost everywhere results in the Banach space $L_E^1(\mu)$ of Bochner integrable E-valued functions (see, for example, [1], [2], [7]). However, not much study has been done for the weak-* scalarly integrable E'-valued functions.
In this work we aim to give a condition for the weak-* Césaro convergence almost everywhere in the space of weak*-scalarly integrable E'-valued functions.

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Construction, suivant une clause récursive, de formes géométriques ordinaires

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Résumé

Les systèmes d'enseignement des mathématiques hésitent à associer des courbes fractales à des formes géométriques ordinaires telles que le cercle, l'angle, la parabole, etc. Pourtant, la spécification mathématique de ces objets n'est pas complètement assurée ni par leur traçage à main levée, ni par l'explicitation de leurs équations cartésiennes ou paramétriques. En effet, cette spécification doit mobiliser les deux axiomes du continu de l'axiomatique de M. Hilbert, à savoir, l'axiome d'Archimède et l'axiome d'intégralité [1]. Pour cette spécification, il est nécessaire de s'appuyer sur une construction de ces formes suivant une clause récursive [2].

Une telle construction est difficile à obtenir sur le tableau noir comme support. Par contre, des logiciels de géométrie dynamique rendent disponibles des supports la supportant. L'intervention vise présenter des relations inattendues entre chacune des formes géométriques cités et des courbes fractales [3].

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Some Constructions of a strongly co-hopfian Abelian Group

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Abstract

An abelian group A is called strongly co-hop_an if for every endomorphism f of A the chain $Im(f^n)$ is stationary. In this work we characterize some properties of the strongly co-hop_an abelian group. Then we show that the p-component of strongly co-hopfian abelian group is also strongly co-hopfian but for the torsion part we construct strongly co-hopfian abelian group whose the torsion part is not strongly co-hopfian.

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Problème de Complémentarité Linéaire

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Résumé : Un Problème de Complémentarité Linéaire consiste à trouver $z \in IR^n$ qui vérifie : $0 \leq z \perp (Mz + q) \geq 0$ où $M \in M_{n\times n}$ et $q \in IR^n$ sont donnés.
Il est bien connu qu'il est impossible d'assurer l'existence de solutions d'un problème de complémentarité linéaire associé à une matrice et à un vecteur quelconques. Ce qui pousse à poser les questions suivantes : sous quelles conditions sur cette matrice et ce vecteur, ce problème admet une solution, et en cas d'existence, qu'elles sont les conditions pour l'unicité de cette solution. Une fois l'existence et l'unicité assurées, comment exprimer cette solution en fonction des données du problème. Malgré la grande importance que les problèmes de complémentarité jouent dans plusieurs domaines, ils ne sont pas à l'heure actuelle complètement résolus. Dans cette communication, nous présentons la méthode LEMKE pour résoudre ledit problème.

Mots clés : Problème de Complémentarité Linéaire, Méthode de LEMKE.

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1. Y. EL FOUTAYENI, H. EL BOUANANI, M. KHALADI, An (m+1)-step iterative method of convergence order (m+2) for linear complementarity problems, Journal of Applied Mathematics and Computing (Springer), 54 (2017) 229-242.
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ABSTRACTS

SESSION V : APPLIED MATHEMATICS TO ECONOMICS

Estimation, evaluation and forecast: time series and neural network

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Abstract
Time series prediction is a problem that has been addressed for many years. There are applications in different fields such as: finance, medicine, transport .... In this communication, we were interested in stochastic methods and methods derived from artificial learning: neural networks [1-2]. The article details some of the problems and techniques involved in setting up ANN (Artificial Neural Network) models for a forecast based on one and then several explanatory variables. The neural architecture considered is that of the multi-layer perceptron (MLP)[3]. The results were obtained by simulation using the R and Matlab calculation software.
The neural forecasts are compared with those obtained using other forecasting techniques.

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Contribution à la résolution de problèmes de complémentarité linéaire. Application au Problème d'Equilibre de Nash

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Résumé

Les problemes de complementarite Lineaire interviennent dans plusieurs domaines scientifiques, en particulier, en economie. Ces problemes, qui sont un cas particulier des inequations variationnelles, consistent a trouver un vecteur $z \in IR^n$ qui verifie les trois conditions suivantes : $0 \leq z \perp (Mz + q) \geq 0$, ou M est une matrice carree de taille n et q est un vecteur de IR^n [1-4]. L'existence et l'unicité des solutions de ces problemes, quel que soit q, est obtenue, si et seulement si, la matrice M est une P-matrice. Ce n'est que récemment qu'ils ont commencé d'intéresser les chercheurs en economie, et plus precisement, les chercheurs qui travaillent sur les problemes d'équilibre de Nash. Le but de cette presentation est de presenter la methode de Lemke [5] et de l'utiliser pour resoudre un problème d'équilibre de Nash [6].

Mots Clés : Problèmes de complémentarité Linéaire, Problèmes d'équilibre de Nash, Méthode de Lemke.

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Quasi-linear elliptic equations with data in L^1 on Riemannian manifold

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Abstract
This work is dedicated to the study of quasi-linear elliptic problems with L^1 data, the simple model will be the next equation on (M,g) a Riemannian manifold
Δ_p u=f.
Where f∈L^1(M) .Our goal is to develop the functional framework and tools that are necessary to prove the existence and the uniqueness of the solution for the previous problem. Notice that our argument can be used to deal with a more general class of quasi-linear equations.

Keywords: Riemannian manifold, Covariant derivative, quasi-linear elliptic problem.

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ON A DYNAMIC OF A DELAYED EGPI MODEL WITH ECONOMIC CHARACTERISTICS OF POPULATION

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Abstract

In this work, we include the economic characteristics of population (Employed, Unemployed) in the economic growth Solow-Verhulst model. The resulting model is a system of three differential equations with two time delays. The principal objective of this model is to describe the Economic Growth–Population Interactions, hence its name EGPI model. The dynamic is studied in terms of the local stability and of the local Hopf bifurcation.

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Bioeconomic model of harvesting of plankton organisms

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Abstract

Marine planktonic ecosystems are highly dynamic environments subject to a wide range of external forces. This paper derives the conditions for local and global stability of a bioeconomic problem concerning the harvesting of phytoplankton and zooplankton Moroccan areas. The problem of determining the fishing effort that maximizes the net economic revenue of each fishing boat results in a Generalized Nash Equilibrium Problem. Growth of both organisms is governed by parameters as well as externally applied nutrients and the biomass of the other species available as supplemental nutrition. More precisely, we are interested in equilibrium of mathematical game given by the situation where all fishing boats try to optimize their strategies according to the strategies of all the others. The importance of marine reserve is analyzed through the obtained results of the mathematical analysis of proposed system.

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Modélisation bioéconomique, sous divers scénarios de gestion, des pêcheries à stocks plurispécifiques

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Résumé

La présente présentation intitulée «Modélisation bioéconomique, sous divers scénarios de gestion, des pêcheries à stocks plurispécifiques » s'inscrit dans un contexte scientifique qui rentre dans le cadre de la modélisation et de l'analyse mathématique de modèles en dynamique de populations. En particulier, il traite de l'application des mathématiques à la gestion de pêcheries.

Notre contribution porte principalement sur la modélisation et l'étude mathématiques d'un modèle bioéconomique, sous divers scénarios de gestion, de plusieurs espèces marines qui sont en prédation et en compétition entre elles pour l'espace ou la nourriture. Ces espèces marines sont exploitées par plusieurs pêcheurs qui cherchent à maximiser leurs profits en fonction des efforts de pêche déployés. Ce modèle bioéconomique que nous traitons comprend trois parties : (a) Une partie biologique reliant les captures aux stocks de biomasses ; (b) Une partie exploitation qui relie les captures aux efforts de pêche ; et (c) Une partie économique reliant les efforts de pêche aux profits. Nous introduisons ensuite le profit à l'équilibre biologique de chaque pêcheur comme étant la différence entre le chiffre d'affaires et les coûts totaux.

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Global existence for some quasilinear parabolic systems with data measures and arbitrary growth nonlinearities

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Abstract

The goal of this paper is to study existence or nonexistence of global weak solutions for some quasilinear parabolic systems with initial data measures and critical growth nonlinearity with respect to the gradient.
The goal of this paper is to study existence or nonexistence of global weak solutions for some quasilinear parabolic systems with initial data measures and critical growth nonlinearity with respect to the gradient.
Since the data are not regular and the growth of the nonlinearities are critical, the classical techniques based on the prior estimates of the solution and its gradient are no longer valid [2], [3], [4] …
We have developed new techniques appropriate to the types of data and nonlinearities considered. Various necessary conditions are obtained on the data for existence.

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A Comparison between Sukuk and Bonds on the Financial Market of Malaysia

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Abstract

In this paper we study Sukuk (Islamic bonds) on the Islamic financial market of Malaysia, since they present favorable conditions for investment which are compliant with Shariah principles, especially present an attractive environment for both government and Islamic financial institutions. We use government indexes of several maturities while comparing them with their counterparts (conventional bonds) in each maturity, over the periods from 2007 to 2017, while basing on the rate of return, causal links (we performed the Granger causality tests that allow us to establish the causal relationships between bounds and Sukuk) and some risk measures that we calculate using the Garch Models.

Keywords: Sukuk, Islamic Financial Market of Malaysia, Bonds, Shairah, Maturity, Rate of Return, Risk, Granger causality, Garch Models

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Labor Market: Modeling and Mathematical Analysis

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Abstract

In recent years, Researchers have been attempted to use the nonlinear differential equations to analyze economic phenomena. In this paper, we propose a model for the evolution of the labor force (occupied labor force and unemployed). The resulting model is a system of delayed differential equations. It is natural for this system to exhibit periodic or chaotic behaviors, so is economic reality. Therefore, our principal objective is to investigate the existence of some bifurcation phenomena for the proposed model.

Keywords: Delay differential equations; Stability; Hopf bifurcation; periodic solutions; direction of Hopf bifurcation; labor market; occupied labor force; unemployed

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Comparative study of the USD/MAD and EUR/USD exchange rate volatility over all periods of Moroccan foreign exchange market

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Abstract

This study aims to exhibit the difference between the volatility of the USD/MAD and the EUR/USD since the beginning of the foreign exchange market in Morocco. In our analysis, we will use the Generalized Autoregressive Conditional heteroskedastic (GARCH) model to evaluate the conditional variance and the EGARCH (Exponential GARCH) model to capture the volatility asymmetry of these two series. We will also try to exhibit the volatility gap between the USD/MAD and the EUR/MAD through a synthetic analysis of the different periods. It will be based essentially on the interpretation of the parameters of the heteroskedastic models through a market analysis of the different macroeconomic conjectures in the Kingdom of Morocco, and in the rest of the world over all the periods studied. The results obtained demonstrate that the USD/MAD exchange rate has less volatility than the EUR/USD exchange rate; volatility gradually increases after the transition to a new exchange rate regime. The results also show that the conditional volatility studies should be conducted over a continuous period with at least the same method of quotation (same basket of currencies in our case). A special attention will be given to the Kingdom of Morocco's new exchange rate regime in order to initiate the scientific community to the major changes made by the country's monetary authorities and to present the first results of the impact of this regime change on the conditional volatility of the USD/MAD.

Keywords: Exchange Rate, Conditional Variance, Volatility clustering,

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Duality results and dual bundle methods based on the dual method of centers for minimax fractional programs

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Abstract

We propose new duality results for generalized fractional programs (GFP), for a wide class of problems, not limited only to the convex case. Our approach does not use Lagrangian duality, but only an equivalent form of the GFP. We present a general approximating scheme, based on the proximal point algorithm, for solving this dual program. We take advantage of the convexity property of the dual, independently of the primal properties, to build implementable bundle methods, with the support of the general scheme. But, it is well known that the principal difficulty with the duality, is the evaluation of the dual function. To mitigate this difficulty, we propose bundle methods that need only approximate values and approximate subgradients of the objective dual function. We prove the convergence and the rate of convergence of these algorithms. As is the case for dual algorithms, the proposed methods generate a sequence of values that converges from below to the minimal value of GFP, and a sequence of approximate solutions that converges to a solution of the dual problem. For certain classes of problems, the convergence is at least linear.

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Existence of weak solutions for fractional p-Laplacian problem with Dirichlet-type boundary conditions

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ABSTRACT
In our paper we study the existence of weak solutions for fractional p-laplacian problem

$$\begin{cases} (-\Delta)_p^s(u-\Theta(u))+\alpha(u)=f \ \ in\ \Omega, \\ \qquad\qquad u=0 \ \ \ on\ \ \partial\Omega, \end{cases}$$

where Ω is a bounded open domain of $\mathbb{R}^N (N \geq 3)$, $p \geq 2$, $N > ps$ with $s \in (0,1)$ fixed, $(-\Delta)_p^s$ is the fractional p-laplacian defined by

$$(-\Delta)_p^s u(x) = 2 \lim_{\varepsilon \to 0^+} \int_{\Omega \setminus B(x,\varepsilon)} \frac{|u(x)-u(y)|^{p-2}(u(x)-u(y))}{|x-y|^{N+ps}}\, dy,$$

for $x \in \Omega$, where $B(x,\varepsilon)$ is the ball centered at $x \in \Omega$ with radius ε.
$f \in L^\infty$, α, Θ are real functions satisfying the following assumptions:

(H_1) : α is a continuous function defined on $\mathbb{R}$ such that $\alpha(x).x \geq 0$ and there exists a positive constant λ_1 such that $|\alpha(x)| \leq \lambda_1 |x|^{p-1}$ for all $x \in \mathbb{R}$,

(H_2) : Θ is a continuous fucntion from $\mathbb{R}$ to $\mathbb{R}^N$ such that for all real numbers x, y, we have $|\Theta(x)-\Theta(y)| \leq \lambda_2 |x-y|$, where λ_2 is a real constant such that $0 < \lambda_2 < \frac{1}{2}$.

Key Words: *Fractional p-Laplacian, fractional Sobolev spaces, weak solutions.*

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Hopf bifurcation Analysis of Solow model with a structured population

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Abstract

This paper is concerned with a delayed model of mutual interactions between the economically active population and the economic growth. The main purpose is to investigate the direction and stability of the bifurcating branch resulting from the increase of delay. By applying the normal form theory and the center manifold theorem, it is shown that the system under consideration can undergo a supercritical Hopf bifurcation and the bifurcating periodic solution is stable in a neighborhood of some bifurcation points.

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Bayesian Analysis of Jump diffusion Stochastic Differential Equations in Finance.

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Abstract
Financial stocks are often modeled as stochastic differential equations "SDE". These equations can describe the behavior of assets, and sometimes that of some model parameters. One of the characteristics of these equations is that the price of the action is a continuous function of time, but some rare events can lead to sudden price changes. To better model the risks associated with these sudden changes in market prices, we use the discontinuous trajectory processes, known as "jump processes".

The purpose of this work is precisely the study of the “jump processes” in order to use a Bayesian estimation method parameters for a diffusion model for discrete observations, while inspiring approach presented by Eraker (2001) [1]. The method is based on the Monte Carlo technique Markov Chain (MCMC) [5].

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Problème d'Evaluation d'Options Américaines Algorithme de Lemke

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Résumé : Sur le marché des produits dérivés, une option correspond au droit d'acheter ou de vendre un actif sous-jacent à une échéance et un prix déterminé d'avance. Les options pouvant être exercées à tout moment entre leur date d'achat et la date d'échéance sont dites «***options américaines***». Les options exerçables exclusivement à l'échéance sont dites «***options européennes***». Estimer le prix d'une option américaine est l'un des problèmes les plus difficiles de la théorie des options. La difficulté réside dans le fait que contrairement à une option européenne, une option américaine n'a pas de solution explicite. D'où l'intérêt de réfléchir à des méthodes d'évaluation d'une option américaine. Dans le cadre défini par Black et Scholes, le problème d'évaluation d'une option américaine peut être discrétisé en un ***problème de complémentarité linéaire*** (LCP). Dans cette communication, nous utilisant l'algorithme de Lemke pour résoudre ce problème d'évaluation d'une option américaine.

Mots clés : Options européennes, Options américaines, problème de complémentarité linéaire, Algorithme de Lemke.

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Game theory and social applications: Voting games as social choice functions.

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Abstract

In this communication, we consider the problem of modeling voting situations as decision games for which we study the procedures to aggregate individual preferences. We recall the equilibrium concepts being easier to incorporate in large sequential games than the models and solution concepts used by "the theory of voting". We explore cases where sets of alternatives are "ordinary" sets, finite sets and infinite sets.

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Estimation des Paramètres du Modèle *GARCH* Basée sur le Filtre de Kalman

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Abstract
Dans ce travail, on propose un cadre de recherche orienté vers la généralisation de la méthode d'estimation des paramètres du modèle $GARCH(p,q)$ [1], [2]basée sur le filtre de Kalman et sur la méthode des perturbations simultanées stochastiques[3] comme technique d'optimisation, et ce pour des ordres p et q supérieurs strictement à 1.Un filtre de Kalman avec contraintes sur la variable d'état[4] est utilisé afin de tenir compte de l'information éventuellement connue à priori sur la volatilité, en l'exploitant dans le but d'assurer un meilleur ajustement des estimations des paramètres. Des simulations de cet algorithme appliqué au modèle $GARCH(p,q)$ pour les cas $p \in \{1,2\}$ et $q \in \{1,2\}$ sont faites et ont exhibé l'efficacité de la technique proposée.

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Accurate description for "E-service" concept Case of Morocco

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Abstract

E-Government is expected to play a critical role for public administration and governance in the future [1]. The online services component of the E-Government Development Index (EGDI) is a composite indicator measuring the use of ICT by governments to deliver public services at national level [2]. However, there is a little consensus on the meaning of the concepts used to describe and discuss these e-services [3].” Public service" concept is wide and complex, we argue that there is no accurate definition of this meaning. Any interaction between citizens and public agencies is perceived as “Public service”. Is the government offering us a ‘service’ when we pay taxes just because Internet is used as a communication channel? [4].

The need to describe a service is like the need to label goods or products in a supermarket [5].In this communication, we present our new framework for describing ‘’ Public service’’ using a simple approach by asking simples questions: What is Public service?(Definitions) Why we use Public service? (Results) Where the Public service is available? (Infrastructures) and How we use Public service (Interactions).

Morocco is among countries that has a higher E-Government Development Index (EGDI) levels (Between 0.50 and 0.75) [6]. We discuss the project of Ministry of Administration and Public Service Reform to develop an identification and classification reference system for public services in Morocco

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Bifurcation And Chaos In the Open Macr-economique model IS-LM

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Abstract
The main object of this work is to formulate a generalized delayed IS-LM model with anticipation function. First, we study the stability of the economic equilibrium and the local existence of Hopf bifurcation. Furthermore, we apply the Hopf bifurcation theorem to predict the occurrence of a limit cycle bifurcation for the time delay parameter. Finally, we verify the theoretical results by studying an example.

Key Words
Business cycle, equilibrium, stability, delay, anticipation, Hopf bifurcation.

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A new numerical method for finding the Pareto front of multi-objective optimization problems

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Abstract
Multi-objective optimization has a significant number of real-life applications. Under this motivation, a new algorithm is developed for solving multi-objective optimization problems with both linear constraints and bound constraints on the variables. At each iteration of the algorithm, the search direction is obtained by solving an appropriate quadratic subprogram. Bisection technique is used to find step-sizes. We prove that the proposed algorithm converges to points that satisfy the Kuhn-Tucker first-order necessary conditions for Pareto optimality (the Pareto-critical points). This method is implemented in MATLAB, and applied on some benchmark problems to test the performance of the algorithm and the results are compared with those obtained using existing methods.

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Asymptotic Properties of the hazard Function with Explicatory Functional Variable for Quasi-associated Data

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Abstract
we have in this paper, a study on the asymptotic properties of the kernel estimator of the conditional hazard function (introduced by Ferraty and Vieu (2000)) when the covariate is functional. The principal aim is the investigate of the convergence rate of the proposed estimator in case of functional associated data.
Key words : conditional hazard function, non-parameter kernel estimation, Probabilities of small balls, quasi-associated data.

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The Close Enough Traveling Salesman Problem

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Abstract

The use of radio frequency identification (RFID) allows utility companies to read meters from a distance. Thus a meter reader doesn't need to visit every customer on his route, but only get within a certain radius of each customer. This notion of only needing to be close enough changes the meter reading problem from a standard Traveling Salesperson Problem (TSP) into a variant problem called Close Enough TSP (CETSP). For more details about the TSP, see Fischetti and al [1], Srivastava and all [2], Applegate and all [3]. For details about the CETSP, see Mennell and al [4], Behdani and al [5]. In this communication, we present a mathematical formulation of the CETSP as a non-convex, mixed, integer, non-linear program (MINLP). See details of this formulation in S. Semami and al [6]. Then, we present in brief the resolution approach based on the Branch-Cut-and-Price (BCP) algorithm as implemented in SCIP (Solving Constraint Integer Programs), see T. Achterberg [7]. Our tests were carried out in an Intel Acer with 2.80 GHz, running under Linux. We performed a series of experiments based on a large scale of CETSP instances given by Dr. Hà [8]. Optimal solutions are obtained for problems with up to a thousand of customers.

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Functional local linear estimate of the conditional density with missing at random

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Abstract

In recent years, the considerable progress in computing power makes it possible
To collect and analyze more and more cumbersome data. Many multivariate statistical techniques, concerning parametric models, have been extended to functional data and a good review on this topic can be found in [2] or [6]. Recently, new studies have been carried out in order to propose nonparametric methods taking into account functional data. We refer to [5] For a more comprehensive review on this subject. The kernel density estimation has been an important topic in statistics. A large number of works have dealt with the kernel density estimation. However, it is well known that a local polynomial smoothing procedure has many advantages over the kernel method (see [3] and [4] for more details). In particular, the former method has better properties, in terms of bias estimation. Missing data often arise in various settings, including surveys, clinical trials, and longitudinal studies. Responses may be missing, and methods for handling the missing data often depend on the mechanism that generates the missing values, see [1]. In many practical works including for instance sampling survey, pharmaceutical tracing or reliability, data are often uncompletely observed and part of the responses are missing at random (MAR) . In this communication, we investigate nonparametric estimation by the local linear method of the conditional density with data missing at random, of univariate response variable Y_i given the functional variable X_i. The aim of this work is to show the almost convergence of our estimator under some general conditions. The effciency of our estimator is evaluated through a simulation, on a finite sample, to prove the superiority of our method to the standard kernel method.

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Optimal portfolios for emerging markets : An Estimation form CAPM fractal regression

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Abstract
The mean-variance portfolio optimzation, proposed by Markowitz [1], provide a framework to construct an optimal portfolio from risk-retturn approach, the Capital Asset Pricing Model (CAPM) developed independently by [2-4], describes the relationship between an asset and the market in a simple linear manner. Beta parameters from CAPM has been widely used as inputs to Markowitz optimization procedure [5]. However both Markowitz approach and CAPM model are connected to understanding a market as efficient with respect to the efficient market hypothesis (EMH)[6]. In this paper we propose the construction of multiscale optimal portfolios using a fractal regression introduced by Kristoufek [7] as inputs in the Markowitz procedure for four emerging stock markets: China, the Czech Republic, Hungary and Russia. This feature will help us to identify whether investors are homogeneous or heterogeneous in their expectations and if they have common or different investment horizons.

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Study of Class of Reaction-Diffusion System

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Abstract

Chemical kinetics is one of the most important domains in which mathematical modeling is used. This branch of science groups together works aimed at describing qualitatively and quantitatively the evolution of chemical systems and the different processes appearing in Chemical reactions. One of the aims of chemical kinetics is qualitative: for example, it is a question of describing the modes of activation of a chemical reaction which, of course, requires adequate conditions for its triggering. Another object of qualitative chemical kinetics is to study the different chemical species which may appear in the reactions. We distinguish other major types of active forms: activated molecules, radicals, ions, complexes (combinations of chemical species). We are mainly interested in quantitative or formal chemical kinetics. The key quantity is that of the reaction rate. Knowing the nature of the constituents, it is necessary to specify the quantitative influence of all the measurable factors on the reaction rates.

In this work, we are interested in modeling the evolution of chemical reactions in the form of a differential system or a reaction-diffusion system. We have improved the technique developed by Morgan to obtain Global existence with more general edge conditions. A numerical code has been produced allowing taking into account the various non-linearity.

Key words: Chemical kinetics; Mathematical modeling; Reaction rate; Reaction-diffusion system; Global existence and positivity; Finite element method.

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ICRAMCS 2019

Pettis conditional expectation of closed convex random sets in a Banach space without RNP.

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Abstract: *The conditional expectation of random variables (resp. random sets) is the main tool of the martingales theory. The existence of conditional expectation for Bochner integrable random variables and integrably bounded random sets were proved without any additional conditions (Dudley [3], Neveu [9], Hiai-Umegaki[6]). But the conditional expectation of Pettis integrable function does not generally exist. Then the existence of conditional expectation for vector (resp. multi-) valued Pettis integrable random variable (resp. random sets) is proved by several authors under the assumption that the Banach space possesses the Radon Nikodym property (RNP) (see Musial [8], Faik [4], Amrani [1], Ziat[10]). Recently two results of existence the Pettis conditional expectation of convex and weakly compact Pettis integrable random sets have been proved in Harami-Ezzaki [5] without assuming the RNP property of Banach space. The main purpose of this present work is to prove the existence of conditional expectation of Pettis integrable closed and convex random sets in the Banach space without Radon Nikodym property. The results stated here are more general than the case where the random sets are convex and weakly compact. This work contains also several new properties of Pettis integrable random sets as Johnsen's inequality dealing with distance, norm, and support functions. As applications we give a new results of multivalued L´evy's martingale convergence theorem. We end this presentation by proving a new version of dominated convergence theorem for conditional expectation of integrably bounded (resp. Pettis integrable) closed and convex random sets. Our convergence results are established with respect to linear topology. Notice that the linear convergence is more general than the Mosco convergence see Beer [2] and Mosco[7]. Remark that dominated convergence theorem of conditional expectation asserts that* $E^{Fn}(X_n)$ *converges to* $E^{F\infty}(X_\infty)$ *where* (F_n) *is an increasing sequence of sub-σ-algebra, and* (X_n) *is a sequence of closed and convex random sets.*

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Street crossing pedestrian detection system

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Abstract
Pedestrian detection is a key problem in computer vision, with several applications that have the potential to positively impact quality of life. In recent years, the number of approaches to detecting pedestrians in monocular images has grown steadily. We present our pedestrian protection system against moving vehicles using a single video camera installed on the vehicle, this system combines pedestrian detection, trajectory estimation, risk evaluation and driver alert. First, we focus on the pedestrian detection task. Different combinations of image descriptors [1][2] and a number of classification methods [3][4][5][6] have been evaluated on this task. Experiments are performed on a dataset captured on-board a vehicle driving through urban environments. Results show that the best model is HOG/RbfSVM.

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Novel adaptive model for detection of credit card fraud

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Abstract

The detection of credit card fraud is a priority problem for financial institutions and securing this form of payment is no longer an option but rather an obligation. Recent studies have shown that several machine-learning techniques had a good success rate in detecting fraudulent transactions [1]. For credit card fraud, addition constrains must be respected, like: short response time for real-time transactions, low rate of false alarms and the behaviour of the user of the card.

The aim of this paper is to propose a framework for credit card fraud detection, which allow us to insure a multi-level security and take of consideration the above criteria.

This framework is composed of three principal layers. The authentication of the transaction, by passing the usual security level of the financial system, establishing the profile of the incoming transaction and the client profile. In the second layer, according to the incoming profile of the transaction and that of the client, we apply machine-learning technique for a scoring risk. The last layer, we group transactions according to their profile and need, and we use machine learning to classify incoming transactions as fraudulent or genuine. For unbalanced data problem, we apply an undersampling method. The choice of these techniques was based on our latest state of art [1].

To maintain our solution updated a background processing is periodically done, to train the models and discover new rules emerged from these models.

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A New Odometric Localization For unicycle Vehicle: FPGA implementation using VHDL code

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Abstract

The issue of localization and knowledge of the position and orientation of a vehicle relative to its environment is a difficult task. Several techniques and methods have been developed, to ensure the accurate knowledge of the position of a unicycle vehicle in its environment. These techniques can be grouped into two categories; namely methods of absolute localization, in which the position is calculated relatively to a fixed coordinate system through exteroceptive sensors [1-2], and relative position estimates, where the robot position is calculated by incrementing the previous position of the variation measured by proprioceptive sensors [3-4]. In the other hand. The combination of the hardware and software aspects offers a major success of the FPGA in various sectors and especially in embedded systems [5- 7]. This work discusses an FPGA implementation of a new adaptable odometric localization system with all unicycle platforms. The synthesis of the algorithm is made using VHDL code. The proposed method is based on a recursive algorithm to calculate in real time the exact position, the final orientation of the vehicle, as well as position and orientation errors for a given destination. A variable kinematic model allows embedding the same localization system with multiple vehicles of different sizes. Experimental results show rapidity and accuracy of calculations of the localization system designed with two different vehicles.

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Multi-criteria Approach for Optimizing Road Traffic based on Fuzzy Logic and Graph Theory

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Abstract

The development of a smart transport system requires a global vision of the environment. Hence, the creation of a model that will incorporate the collected data with a specific detail. Sensors placed at various strategic points in the road network generate data that is then collected using wireless and mobile communication technologies [1]. Such as GPRS [2], or through a traffic simulation system [3-4], then stored in large databases. This data can be used to predict the evolution of traffic density [5]. This work discusses the development of an intelligent system based on fuzzy logic [6-8], in order to generate the weights between two vertices of a graph that will constitute a basic modeling of an urban road traffic. Multi criteria analysis will allow synthesizing a simple and efficient fuzzy rule base based on human expertise. The weights generated by the developed fuzzy system will be between zero and one, so that the weight converging towards zero will be considered the most optimal. A simulation using MATLAB / SIMULINK shows the efficiency of the method developed for fixed and dynamic inputs. Furthermore, the application of the Dijkstra algorithm [9] will allow us to calculate the most optimal path according to the fixed criteria set.

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A New Approach For Dynamic Traffic Lights Management Based On Fuzzy Logic Theory

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Abstract
Urban road traffic is at the heart of many problems, this critical aspect intervening daily is unfavorable to many fields. Such as economics or ecology [1-4]. For these reasons, Intelligent Transportation Systems (ITS) have emerged since the late 1990s. The conventional traffic lights change the state at a constant cycle time. In many cities, Automatic traffic lights are often based on a constant cycle by setting the duration of green and red light. In this case, the lighting period of the green (or red) light is determined on the basis of a static model. In this work, the problem of the fixed duration generated by road signaling systems is solved through the implementation of an intelligent and dynamic system based on fuzzy logic [5-6]. The developed system considers two two-way intersections. The results show that the proposed method allows adjusting the changes of the green light time intervals with respect to the real-time traffic situation level, offering better performance in terms of total waiting time, traveling time, and vehicle queue.

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Optimisation du processus de recommandation pour un nouveau apprenant de MOOC "Cold start Learner"

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Résumé

Le dropout [1] est l'un des problèmes récurrents qui marquent les MOOCs ; cela est dû en grande partie aux recommandations statiques proposées aux apprenants. A cet effet, la mise en place d'un système *one-size-fits-all* [2] n'est plus adaptée à ce type d'environnement qui regroupe des milliers d'apprenants ayant des profils et styles d'apprentissage différents [3]. Le recours à certaines approches de personnalisation demeure une solution efficace pour palier à ce genre de problèmes. Ce travail est une tentative d'intégration d'un système de recommandation adaptative avec le Mooc, basé sur une approche hybride [4] qui combine entre plusieurs techniques de filtrage envisagées dans la littérature. L'objectif de cette approche est de recommander à l'apprenant des ressources internes (Concepts, fils de discussion) et ou des ressources externes (RELs, MOOCs) pour atteindre ses buts dans les meilleurs conditions. La procédure de recommandation est fondée sur des modèles de l'apprenant et du MOOC [5] ; A ce sujet nous avons opté pour certains algorithmes afin de représenter le niveau de performance lié à l'acquisition des connaissances, la distance entre les concepts et le degré de similarité entre les apprenants [6] afin d'améliorer les performances de recommandation.

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Etude sur la reconnaissance automatique des expressions du visage en utilisant l'apprentissage profond

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Résumé :

Les expressions faciales humaines sont extrêmement essentielles dans la communication ainsi que dans les interactions sociales. La communication implique a la fois verbale et non verbale, les expressions faciales sont les caractéristiques clés de la communication non verbale. Les progrès rapides de l'intelligence artificielle annoncent une nouvelle ère, celle des machines capables de fournir des services meilleurs et plus personnalisés lorsqu'elle connaît l'émotion humaine, à l'aide des techniques d'apprentissage profond, qu'insistent sur la précision de reconnaissance exceptionnelle après une formation avec de grandes quantités de données.

Dans cet article, nous présentons des techniques d'apprentissage en profondeur utilisés, et capables de découvrir une représentation plus profonde des caractéristiques de l'expression faciale afin d'obtenir une reconnaissance automatique, tel que les réseaux de neurones convolutionnels (CNN).

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ABSTRACTS

SESSION VI : COMPUTER SCIENCE

La modélisation de système intelligent des réseaux routiers orientés graphiques

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Résumé :

La croissance rapide du nombre des véhicules dans le réseau routier a un impact négatif sur la circulation. Afin de faciliter le déplacement d'un point à un autre, nous avons proposé un système intelligent, basé sur la modélisation macroscopique et le traitement graphique. Nous allons utiliser les paramètres de cette modélisation telle que le débit, la concentration, la vitesse moyenne et la pression routière. Ces variables peuvent être calculées à tout moment, Nous avons proposé de déployer des capteurs routiers et des réseaux véhiculaires générant d'énormes données appelé Big Data. Il y a divers algorithmes graphiques utilisés pour réaliser un transport intelligent en prenant des décisions intelligentes en temps réel pour faciliter le déplacement. Le système est implémenté à l'aide de l'outil Giraph et Spark en haut des nœuds parallèles Hadoop pour générer et traiter des graphiques en temps quasi réel. De plus, le système est évalué en termes d'efficacité en considérant les variables macroscopiques et le temps de traitement du système. Les résultats montrent que le système proposé est plus évolutif et efficace.

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Régression linéaire multiple et programmation dynamique pour optimiser les stations de rechloration d'eau potable

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Abstract
La conservation de la qualité de l'eau à la sortie d'une station de traitement exige le maintien en permanence, en tout point du réseau, d'un taux de chlore résiduel minimal. Ceci n'est possible que si on prévoit des injections de chlore dans différents points du réseau grâce à des stations de rechloration intermédiaires. Vu le coût important de la mise en place de telles stations, l'optimisation du nombre et le choix d'emplacement de ces stations constituent les deux difficultés auxquelles sont confrontés les gestionnaires. Pour ce faire, nous avons élaboré un outil d'aide à la décision qui permet de calculer la distribution de chlore en tout point du réseau [1] et de proposer les meilleurs emplacements de stations de rechloration intermédiaires [2]. Pour l'optimisation du choix de ces emplacements, nous avons adopté deux approches différentes : une basée sur la programmation dynamique tandis que l'autre repose sur la théorie des graphes. Nous avons également proposé un modèle de régression des conduites déterminé par apprentissage automatique (Machine Learning). Les tests de performances de notre système d'aide à la décision ont été effectués sur des sites réels du réseau de distribution de la Wilaya Rabat-Salé. Les résultats obtenus montrent que l'apport de la théorie des graphes est meilleur que celle de la programmation dynamique dans la mesure où le temps de réponse est amélioré.

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1st International Conference on Research in Applied Mathematics and Computer Science
ICRAMCS 2019

Internet des objets : Challenges, Caractéristiques et Applications

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Résumé :

Internet of things (IOT) présente une révolution technologique qui cible différents domaines, c'est une évolution de l'internet qui permet l'extension de l'internet à des objets et des lieux du monde physique. IOT sert à améliorer la qualité de vie tout en offrent des solutions à usage facile pour les utilisateurs civils et les entreprises. Il s'agit d'un domaine en plein expansion, malgré cette évolution il rencontre toujours des challenges tels que l'interopérabilité et la sécurité. Le fonctionnement des systèmes IOT nécessite un ensemble de technologie (Wifi, Bluetooth…), actuellement les travaux de recherche s'intéresse plus à la connectivité et la fiabilité de ces systèmes. Dans ce travail nous nous intéressons à l'état d'art du système IOT, en particulier aux défis tel que les différents types d'interopérabilité (sémantique, technique, organisationnel …), aussi nous allons mettre l'accent sur les caractéristiques de l'IOT (Hétérogénéité, Connectivité …) Avec des exemples d'applications de l'internet des objets dans divers domaines.

Mots clés : Internet of things, sécurité, interopérabilité, application

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On the Egyptian Product-Based Encryption

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Abstract

Chaotic systems possess many distinct characteristics, such as deterministic but random-like complex temporal behavior, high sensitivity to initial conditions, fractal structure and long-term unpredictability[1], thus inviting the design of new encryption schemes with required properties, such as confusion and diffusion. Moreover, the link between some conjectures in number theory (as the normality of π) and ergodicity in some discrete dynamical systems has opened new perspectives in chaos-based cryptography. Egyptian fractions, for example, can be used for their good statistical properties as concatenation and binary expansion of involved denominators have satisfactorily passed the NIST statistical test suite for randomness[2], which can be seen to a certain extent as a tool to complete the conventional class of pseudo-random number generators already in use. At a theoretical level, the underlying recurrence function (and some of its variants) has already been shown to be ergodic[4], thereby supporting the statistical tests. Our modest contribution to the subject besides one-time pad encryption technique, is to suggest a new function which converts the involved denominators to floating points in the unit interval, and to test its randomness (and then its usefulness in cryptography) in the same way as the logistic function serves to the well-known Baptista's method[3]. The first results are encouraging and will be shared within the present talk.

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Vers un système informatisé d'orientation de l'étudiant Marocain

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Abstract

Le choix de la bonne carrière peut être difficile pour les étudiants, car ils doivent tenir compte de nombreux éléments, afin d'être sur le meilleur chemin. Aujourd'hui, les systèmes E-orientation ont le but d'aider l'étudiant pour trouver les meilleures solutions à son devenir scolaire et professionnel. Dans ce contexte le Centre des Sciences de L'Ingénieur et Sciences Appliquées « SISA » a financé le projet MMSyOrientation pour mettre l'accent sur l'orientation des étudiants au Maroc. Notre but c'est d'avoir un méta-modèle instanciable des plates-formes E-orientation permettant de faciliter l'orientation des étudiants.

Pour aboutir à notre objectif mentionné ci-dessus, une étude comparative des plates-formes existantes s'avère essentielle vis à vis la particularité et les caractéristiques divers des plates-formes existant [1]. Dans cette communication on procédera par une étude comparative d'un échantillon de plateformes afin de ressortir les fonctionnalités majeures qu'on modélisera à travers des fichiers descriptifs. Le travail se divise en deux parties : La première partie est une comparaison et description des plateformes existantes utilisant le langage descriptif (WSDL) [2], la deuxième partie utilisera l'ETL[3] comme technologie de transformation afin de ressortir des fichiers génériques qui serviront de base de travail pour le méta model attendu.

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Sentiment analysis In Social networks: State of art

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Abstract

Nowadays, several platforms on the web and social networks like Facebook, Twitter, Imdb (Internet Movie Database) propose to file opinions, share feelings and opinions on a variety of topics. This information is very important in several fields like policy [1], digital marketing, social or individual, and their analysis allow as to extract opinions and to determine the subjective information contained in the texts. However, the automatic detection of opinions and the analysis of feelings are confronted with problems that distinguish it from traditional thematic research, because the sentiment is expressed in a very varied and very subtle way.

In this paper we present an analytical and statistical study of different researches conducted in the last three years on sentiment analysis in social networks. Our comparative study takes into account the research objective, the data source and size, the data language classification (structured, semi-structured and unstructured), the preprocessing steps, the opinion classification approach and the validation process, we can classify the sentiment analysis approaches on: Lexicon or dictionary based approaches [2], Ontology based analysis [3] and Machine learning based ones [4][5]. Moreover, we notice that the most classification techniques used are Naïve Bye algorithm and SVM (support vector machine). Form data set point of view, we have found that the most analyzed social media platform is Twitter with 80%; most works were on structured language and especially on English texts and very few studies were interested in opinions written in unstructured languages like Moroccan Dialect. The preprocessing step is more difficult in this case, due to the lack of corpus, dictionaries and ontology and techniques adapted to these languages and these are the propose of our future works.

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Nouvelle architecture de filtre passe-bande pour les applications large bande

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Abstract

La technologie ultra-large bande (ULB) a été développée pour les systèmes de communication sans fil et les récepteurs frontaux RF. La difficulté de concevoir des circuits ULB dépend des topologies de réseaux et des composants du circuit. En fait, le dimensionnement de systèmes de communication à large bande nécessite l'étude de nombreuses fonctions de composants différents, y compris les filtres avec une sélectivité raisonnable.

Le filtre passe-bande est un réseau à deux ports utilisé pour transmettre et atténuer les signaux dans la bande de fréquence spécifiée. Il présente plusieurs avantages pour différentes applications, mais nécessite une petite taille tout en ayant de faibles pertes. Différentes techniques sont utilisées pour avoir un filtre compact.

Dans cet article, nous présentons une nouvelle topologie de filtre passe-bande pour l'adaptation d'impédance large bande des amplificateurs micro-ondes. Le circuit final est simulé et optimisé à l'aide du système de conception avancée du logiciel ADS d'Agilent. Le filtre étudié est déployé sur un substrat diélectrique époxy FR4 avec une épaisseur de 1,6 mm. L'approche de conception permettant de déterminer les dimensions physiques a fourni de bons résultats. Le filtre présente des avantages remarquables, tels qu'une taille compacte, une structure simple et une sélectivité élevée. Les résultats de simulation indiquent des pertes de rendement inférieures à -20 dB sur toute la bande de fréquences.

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Student Profile Analysis using Machine Learning : State of Art

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Abstract

Profile modeling is an important process that aims to give as complete representation as possible of all the aspects related to the user features[1]. In the educational field, student profile modeling can give important solutions to variant problems. It can mainly offer the most exact description of students in order to:

- Be able to act in case of problems such as failure, drop out ....;
- To offer students the most appropriate orientation and recommendation[2];
- To define the most adaptive learning resources depending on their profiles....

In this paper, we present an analytical and statistical study on student profile modeling in relation with machine learning techniques[3] during the last four years. Indeed, Machine learning techniques have been widely applied in the field of education to extract information and useful patterns in order to describe student's profiles and improve their outcomes. The results of this study show that: first; researches are interested in eLearning and online behaviors more than on-campus[4], and therefore the data source used for student profile analysis is primarily based on data related to online activities more than the academic and demographic data[5]. Second; Student profile prediction depends on variant descriptors which can be categorized into: demographic data, social data, behavioral data, academic data, school background, learning style data and finally marks and results. Third; student behavior has been predicted in different situations such as success and failure, at risk student, dropout, course retention... and finally, decision tree is the most used machine learning technique.

In our future works, we attempt to propose student profile model that can be exploited in many situations such as: prediction, classification, adaptive learning, e-recommendation.

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Modèle de Sélection des services web à base de QOS

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Abstract

Lorsqu'une application est de type web, ses tâches composantes peuvent être exécutées à l'aide des services web. En particulier, pour une même tâche, on peut découvrir plusieurs services web aptes à l'exécuter, on serait alors face à un problème de sélection de services web afin de choisir la combinaison de services qui offre la meilleure qualité de service[1]. Nous avons présenté dans ce travail, la problématique de sélection de services base de QoS. Nous avons aussi mis en évidence, un état de l'art illustrant les travaux de recherche sur cette problématique[2]. Plus précisément, nous avons présenté les travaux qui appartiennent aux quatre classes, à savoir les méthodes exactes[3], les méthodes heuristiques[4], les méta-heuristiques[5][6][7][8][9] et les méthodes basées sur la dominance au sens de Pareto[10]. En général, nous pouvons conclure que les méta-heuristiques sont mieux adaptées à cette problématique par rapport aux autres, puisque les méthodes exactes ne passent plus à l'échelle. En plus, les approches heuristiques ne sont pas généralisables pour toutes les sortes de fonctions objectifs. D'autre part, l'optimisation à base de Pareto n'est plus efficace lorsque le nombre de critères de QoS est grand. Par conséquent la meilleure classe d'algorithmes qui gère tous ces compromis (nombre donné d'attributs de QoS, complexité polynomiale, quasi-optimalité de solutions, adaptabilité) sera la classe des méta-heuristiques.

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Arabic Word Semantic similarity: a survey

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Abstract

Word semantic similarity consists of calculating how similar two words are [1, 2]. It is one of the most important tasks of TALN, which is not an end in itself but it is an intermediate phase for many applications such as information retrieval, machine translation, sentiment analysis, [3] etc. To compute this similarity, traditional approaches, also known as knowledge-based approach, were based on the distance between words on taxonomy, in this category; we have edge-based calculation [4] or node-based calculation [5]. On the other hand, recent approaches use vector representation based on very large corpora. This representation is known as word embedding. The word semantic similarity is therefore attained by the cosine of vectors embedding [6, 7]. In this communication, we present an overview of Arabic word semantic similarity methods. We give a comparison of them. We discuss particularities of each of these methods. And finally, we mention the challenges encountered for the specific case of Arabic language.

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RDF Management Systems: Evaluation Criteria and Comparison

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Abstract

We establish a list of evaluation criteria for the evaluation and comparison of existing RDF management systems. Contrary to the existing comparison works (e.g., [1]-[5]) that only considers query execution and some specific targeted triple stores, our comparison criteria list is given taking into account various factors related among others to storage types, query processing, dynamicity, security, concurrency and scalability. Also the list is not limited to special stores but covers all types of stores including among others relational, native and big data stores.

We first give a categorization of existing RDF management systems while considering the motivations behind their use for handling RDF data. We identify the benefits of each identified category of systems and the challenges they are facing.

This list of evaluation criteria is then established taking into account the categorization aspects and also various issues related among others to storage models and data organization, data recovering, query processing, query optimization, concurrency, security, dynamicity, scalability, reasoning and data integration.

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Modèle prédictif de la qualité de l'eau à base de Séries temporelles.

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Résumé:

A cause du réchauffement climatique, l'eau est devenue une ressource très importante qu'il faut bien gérer. Cette gestion englobe l'optimisation d'utilisation et l'assurance d'une certaine qualité [1]. Cependant la qualité de l'eau n'est pas toujours garantie et peut connaître une dégradation à cause de plusieurs facteurs [2][3]. Plusieurs techniques sont utilisées pour surveiller et prédire la qualité de l'eau afin d'éviter des conséquences désastreuses. L'apprentissage automatique (Machine Learning) peut être utilisé pour faire ce type de prédiction en se basant sur plusieurs indicateurs [4]. Dans ce papier, nous proposons une solution de prédiction de la qualité de l'eau en se basant sur les séries temporelles [5] et le modèle de machine de factorisation (FM: Factorization Machnine) [6]. Les valeurs des séries temporelles sont des mesures (concentration du chlore, ph, H.A.P, présence de métaux, ...) horodatées relevées par des capteurs placés sur le réseau de distribution.

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PERFORMANCE PREDECTION OF MOROCCAN HIGH SCHOOL STUDENTS

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Abstract

The goal of every company and public sector organization is to provide quality service to their customers and make them satisfied. However, as we move towards a more connected world where technology has been integrated into the business process, handling data has become more complicated. Today, businesses and High School Institutions (HSI) face one of the biggest challenges, which are characterized by the exponential growth of transactional data and how to exploit those data to gain knowledge and transform them into analytical data.

This massive data can be used to improve decision making and management, which requires a proper extracting, cleaning and mining methods. For that reason, data mining has become a major step in the knowledge discovery in databases (KDD) process that can guarantee a collection of solid algorithms and methods for generating descriptive and predictive knowledge.

The aim of this paper is to provide a way to predict and understand the outcomes (Grades) of HSI students' by offering a new description to data and making it more valuable using data mining techniques. We used four different datasets for this study throughout the years (from 2012 to 2016) in tow courses French and Mathematic, which was collected from a HSI Enterprise resource planning (ERP) database.

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Analytical text for social networks

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Abstract

The Web and also the social media networks gather a rich content in multitude areas which interests companies, including customers reviews, there claims, expectations and competitive aims. The Web content may interest the political analysts as well, especially relative to polls of opinions, feeling and appreciations of different political tendencies.
The text analytics acquaints the economic, social or political actors with relevant information to inspire those actors for the development of initiatives, plans and programs, and also to conceptualize the processes of their governance.

Text Analytics belongs to the field of linguistics and machine learning. The analytic exploitation of texts is focused on methods, techniques, and special tools to take advantage of unstructured written texts, in particular, from social networks (Facebook, LinkedIn...) in order to extract meaning for strategic, technological, marketing, commercial political or social purposes.

Index Terms—
Text mining, Analytic extraction, social networks

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Profiling Activity: Studying Learning Style for Generating an Adaptive Learning Game

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Abstract

Several studies have been conducted in the field of Technology Enhanced Learning(TEL) have shown that the adaptation to learner's learning styles is a task that must be taken into account during the design phase of the educational sequences in order to increase the student's motivation. Cognitive psychologists have proposed various models of style, which it's often represented by using multiple dimensions statistically estimated, each model suggests an instrument for measuring an individual's learning style. Most of them use questionnaires such as (Honey and Mumford (1992), Kolb (1984), Index of Learning Styles (ILS)) [1][2][3]. For this reason the main aim of this paper is to show the results of a study that was addressed to PhD students of the Faculty of Sciences of Meknes 2016. The sample of the population was made up of 300 doctoral students. The principal goal is to illustrate the effectiveness of the French version of the Index of Learning Styles (ILS) and to reduce it, using the factor analysis in order to decrease the time spent by student via this test. This entries done in order to facilitate the generation of an adaptable Learning Game (LG) according to the students learning style and to augment their learning motivation[4].

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Collaborative filtering approach in recommender systems: Study and Analysis

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Abstract

Recommender systems aim to present to a user the items which may interest him. Their main aim is to utilize the various sources of data to infer customer interests [1]. Currently, they are proposed in several domains, namely: e-commerce, e-learning, research, music, social networks, etc. There are mainly three approaches that are used in the recommender systems: the content based filtering, the collaborative filtering, which is one of the most widely used and successful approach in the recommendation field by far [2], and the hybrid filtering. In this work, we present a detailed analytical and statistical study of the use and the evolution of this approach by year, by the application domain, by technique, and finally by problematic in order to know the problematic faced by the collaborative filtering, and the techniques which may help us to solve it. We are based on the articles published about this approach over the last ten years; the results indicate that it knows a fast evolution, which confirm its importance especially in the domains of films and e-commerce. Since it is based on similarity measures computed over the co-rated set of items the large levels of sparsity can lead to less accuracy [3], for that, the most techniques like the clustering [4], the probability [5], TF-IDF [6], the apriori algorithm [7], etc. try to solve the problem of data sparsity as a major problem faced by the collaborative filtering approach.

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Transfer learning and Deep Encoder-Decoder architecture for buildings segmentation

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Abstract

Monitoring urban development and change has often been a tedious task that requires a huge amount of spatial datasets that need to be processed and explored for extracting meaningful information. Remote sensing imageries represent an example of such datasets that can give users and decision makers a precise description of their territories. However, in order to give such description one should explore inner semantic and structural patterns that are contained in satellite imageries, which is often a very complex task and more frequently a difficult one. Such description can be obtained by making use of image semantic segmentation techniques and particularly buildings segmentation.

Many image processing and object-based methods has been proposed to tackle such a problem, but few have relied on the use of newer deep neural networks and architectures to identify building boundaries and to properly conduct image segmentation.

The aim of this paper is to address the problem of semantic segmentation over INRIA [1] aerial imagery dataset. We investigate the benefits of transfer learning with semantic segmentation by using convolutional neural networks. Also, we have making use of a successful deep learning pattern, called Encoder-decoder, that have shown promising results in general semantic segmentation.

Our adopted approach uses an U-Net[2] network where the encoder part is a ResNet-34[3] bound to the decoder part with skip connections. This approach combined with transfer learning have shown interesting results in buildings segmentation compared to a baseline method.

Keywords

Building segmentation, Deep learning networks, Unet, Encoder/Decoder.

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Development of an Algorithm for Enriching the User Profile from his Social Network

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Abstract

Recently information systems have started to develop several mechanisms for improving the user experience on the web, the majority of these mechanisms is based on the use of users profiles, and since these profiles changes from one moment '' t '' to another, they require regular updates and a permanent enrichment, which leads these systems to enrich the profile of each user from the profiles and information of people who resemble him in the same system, but this technique is not applicable to all users of the system, especially in the case of cold start problem [1] and for the less active users, since their profiles are empty we cannot detect profiles similar to them, which leads us to enrich these profiles from information provided by social networks about the users, which gave rise to algorithms for enriching user profiles from social networks.

In this work we aim to improve one of the famous community-based algorithms, for user profile enrichment from its social egocentric network.

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Thermodynamique properties of CH_4 thermal plasmas mixed with H_2

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Abstract

In this work is devoted to the calculation of equilibrium compositions, thermodynamic properties : mass density, enthalpy and specific heat at constant pressure of methane CH_4 thermal plasmas mixed with hydrogen H_2 These data are computed in the temperature range 300–30 000 K at atmospheric pressure. The overall results show that the influence of the presence of hydrogen on the thermodynamic properties is important in this temperature range.

Figure 1 shows the specific heat Cp obtained for CH_4-H_2 mixtures as a function of the temperature at atmospheric pressure.

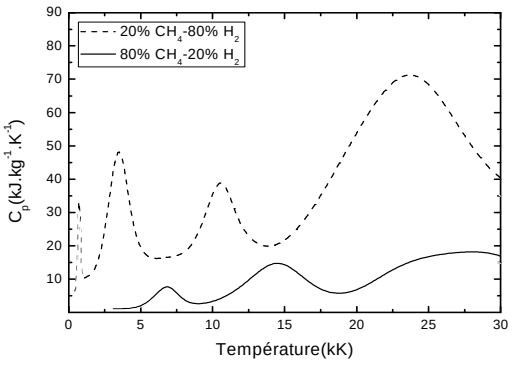

Fig 1. Specific heat at constant pressure a mixture CH_4-H_2.

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The medical image segmentation using watershed transform include merging region

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Abstract
Automatic image interpretation has become more and more important. Increasing the resolution of the different acquisition tools generates a mass of data that can no longer be processed manually. In this context, automatic methods must make it possible to analyze an image in order to help the human expert in his interpretation work [1]. Among these, segmentation, this aims to extract from images a set of information, the proposed algorithm belongs to the category of the hybrid segmentation techniques since it results from the integration of region based techniques through the morphological watershed transform [2]. However, the watershed method has interesting properties that make it useful for many different image segmentation applications when applied to medical image analysis [3], It has important drawbacks: over segmentation, sensitivity to noise, poor detection of thin or low signal to noise ratio structure and others problems, the current approach we use due to correct some drawbacks, to minimize the number of watersheds by merging it but is still close to the original [4]. Firstly, a filter gradient is implemented to detect the boundary of the objects in the input gray image and we mark the minimum gray value of pixels before adopting watershed transformation. Then each region is represented by a graph node and the neighboring nodes are saved in a matrix to compute the dissimilarity between regions we need three features: intensity mean, intensity variance and the number of pixels in a region. Last, the two regions which have minimum cost are merged this will be iterated until the final segmentation result.

Keywords, segmentation, watershed transform, region merging, medical image, intensity

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Fusion of Multiple Behaviors using Fuzzy Logic: Application for an Autonomous Vehicle in an Uncertain Environment

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Abstract

The behaviors are essential to the performance of specific subtasks for autonomous vehicles, which may be for example obstacle avoidance, hole avoidance, or reaching a goal. Many architectures [1-3] seek to emerge intelligent behaviors from the interaction of primary skills reacting to environmental conditions. The behaviors are arranged in priority levels. The behavior of the highest level removes all lower level behaviors. This method is very effective since the nature of the system is modular, but it can't activate more than one behavior at a same time. The ancient works have experienced very rapid growth due to the development of techniques related to artificial intelligence as fuzzy logic [4-5], neural networks [6], and genetic algorithms [7]. This work presents a new Fusion method of multiple behaviors using fuzzy logic. The proposed algorithm can activate a large number of behaviors inspired by the multitasking system of the human being. Behaviors are fused intelligently to get a final command that responds correctly to a situation in an uncertain environment. The general algorithm is based on five fuzzy controllers that will lead the robot to reach a destination from a starting point, while avoiding static and dynamic obstacles, as well as the holes avoidance during its navigation. Simulation results clearly show the capacity of the new algorithm to manage and merge more than two behaviors at the same time.

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Personalized model of good use of IoT protocols

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Abstract

The Concept of the internet of objects appeared in the 90s, it is poised to become one of the future challenges and opens up prospects for technological and scientific developments [1]. The success of the Internet depends on the widespread adoption of clearly defined protocols. or that several IoT protocols have been introduced to provide effective communication between objects. However, their uses are not yet well defining [2]. This research analyzes presents a model of personalized model of automata for the good use of the network protocols based on the criteria of a comparative studies [3] already made namely: Wifi, Bluetooth, LoRa, Zigbee, ZWave, Cellular, NFC, Sigfox, Neul, 6LoWPAN. The study presented in this article would be beneficial for researchers and developers in selecting an appropriate protocol for each type IoT applications as well as the good practices of these protocols.

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Systèmes d'Exploitation utilisé pour l'internet des objets : Étude Comparative

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Abstract

L'Internet des objets on anglais Internet of Things ou IoT, est un concept moderne qui représente l'extension d'Internet à des objets et à des lieux du monde physique [1-2]. L'Internet des objets connectés représente les échanges d'informations et de données provenant de dispositifs présents dans le monde réel vers le réseau Internet.

Actuellement de nombreuses études annoncent l'explosion de volume des objets connectés dans le monde [3]. Cette explosion considérée comme un défi majeur dans le monde entreprise, grâce à eux les entreprises dans toutes les industries entrent dans la concurrence afin de rependre à cette demande, cependant la vie entreprise a été basée sur le concept de l'embarqué ce qui est introduire l'évolution de ce dernier que ce soit le côté matériel ou logiciel tout en suivant la nouvelle technologie.

Le système d'exploitation embarqué [4] est amené à devenir un axe majeur de la communauté informatique. L'évolution scientifique des systèmes d'exploitation embarqués a touché plusieurs axes de recherches, nous citant à titre d'exemple la structuration et la caractérisation des systèmes d'exploitation embarqués, cependant d'autres évolutions ne sont pas mises en place. L'objectif de cet article est de mettre une étude comparative entre les différents systèmes d'exploitation utilisé pour les applications d'internet des objets afin de discuter leur développement dans le domaine IOT.

Keywords: Internet des Objets, système d'exploitation, Système Embarqué, Système d'Exploitation Embarqué.

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Opportunities of machine learning in Cloud Computing

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Abstract

The development of cloud computing contributes to plentiful opportunities to use the power of cloud in order to perform computation on data contributed by various consumers [1]. One of the concerns, as machine learning becomes more affordable through the use of cloud platforms, is that the technology will be misapplied. This already seems to be a pattern, as cloud providers promote machine learning as having wide value [2]. However, that value won't be realized if machine learning is applied to systems that can't benefit from making predictions based on patterns found in data. When machine learning algorithms are associated with cloud computing, it can do wonders for the cloud platform. Machine Learning is constitutionally a time consuming task, accordingly plenty of efforts were conducted to speed-up the execution time. Cloud computing paradigm and cloud vendors turned out to be relevant alternatives to speed-up machine learning platforms [4]. In this work, we will bring you up to date on machine learning and its pertinence to today's IT development and deployment needs, specially for those working within a cloud environment.

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Publishing arabic manuscript documents as Linked Data

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Abstract

The manuscript documents offer a very complete and rich idea of the history of civilization. The number of manuscript documents held by digital libraries is very important which makes the preservation task very important in order to keep these documents in better condition and to have access to the data they contain. The techniques of Arabic manuscript processing are in continuous emergence and offer many challenges to researchers, historian, linguists and several other actors involved. The purpose of this article is to provide an architecture for exploiting semantic web technologies, especially linked data to provide a system for semantic access to Arabic manuscripts

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On the computational efficiency of Dempster's rule of combination

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Abstract

Dempster-Shafer theory [1][2][3] is a mathematical theory of evidence, called also the belief function theory. It is considered as generalized Bayesian theory and has recently received much attention in Artificial intelligence community as very promising for reasoning under uncertainty in expert systems. D-S theory includes reasoning based on the Dempster's rule of combination. Although, it has been shown that direct translation of this theory into an implementation is not feasible because the time complexity is exponential [4]. Dempster's rule of combination belongs to #P-complete class [5][6]. The combination rule of k pieces of evidence with n_k elements, such that $(k \in \mathbb{N} \mid k \geq 2)$ has a time complexity of $\mathcal{O}(2^N)$, where $N = \sum_k n_k$. In this work, we propose a new parallel algorithm for Dempster's rule of combination based on the concept of conquer and divide algorithms. The proportion of task benefiting from improvement is $p = 1 - \frac{2}{k}$, hence $\frac{k}{2}$ of theoretical maximum speed-up according to Amdahl's law.

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Implementation of a computer device to improve the quality of life of students

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Abstract
Our work is concerned with monitoring and periodic evaluation of students' skills acquired during their university education. The objective of our work is to provide software tools for supporting and mentoring students in order to improve their quality of life. We suggest a computing device "ISIFePortfolio" which not only allows monitoring of learners, but also plays the role of an ePortfolio (electronic portfolio) skills, and a social networking combined systems. This tool includes a broad range of collaborative working solutions and the ePortfolio is considered an extension of the "paper" records of a student as an individual digital space available on the Internet in such a secure and personalized way, collecting personal resources, experiences, studies, acquired skills, relationships with trainers, working groups, classmates and that will be saved throughout the training course. Based on Mahara technology, "ISIFePortfolio" is an application implemented by ORDIPU team at the University Hassan II of Casablanca. It has been integrated into the platform of distance education "Education Master ISIF" for the master "Engineering Information Systems and Training."

Keyword: computing device, ePortfolio, skills, digital monitoring of the learner, evaluation, quality of life.

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Locate Learning analytics in context: Embracing Big Data in Educational reforms in Morocco

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Abstract

In the information era, we have observed an upheaval of the volume of data and enthusiasm in the applications for using this metaphorically new gold deposit. Nevertheless, the challenge of utilising data assets and resources to bring change in existing circumstances or to foresee shifts and variations still not present as broadly in an educational setting. Meanwhile, in Morocco, there is still a growing conversation about implementing analytics in various settings. In this regard, to elevate the change including promoting the transition towards analytics in an educational system, we bring this manuscript that depicts the current traditional system of Learning Analytics in comparison with the implementation in other nations. Thus, to locate the state of the art of Learning Analytics in Morocco and inform readers about the use of educational Big Data. Moreover, the design of a Learning Analytics strategy approach to adapt to the cultural, political and socio-economic features particular to the country itself. In consideration of the particularities of the students and the faculty body. This article verbalises the need to keep up with the progress in analytics from several fields and the advancements of Big Data technologies in the world. Conclusively, this work might present scope to the practitioner in Data Analytics, Machine Learning, Deep Learning or Artificial Intelligence a new space of study to apply existing theoretical or applicable strides of analytics in an instructive framework [1].

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Boundary and Pointwise Control actuation of one-dimensional heat equation process via the Takagi-Sugeno Fuzzy PDE Model

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Abstract

In the last few decades there has been a growing interest in Distributed Parameter Systems (DPS), encountered for instance in heat diffusion, flow process, wave propagation and many other fields [1]. This DPS are described by Partial Differential Equations (PDE) with two or more independent variables, that are usually time and space. There are three types of PDE: hyperbolic, parabolic and elliptic.

Our work concentrates on the control of DPS using two approaches. The first one is the boundary control [2], which is applied to actuate the boundary value of the state variable (Dirichlet actuation) or the value of its gradient (Neumann actuation) [3]. The second one is the pointwise control [4], here the spatial domain is divided into subintervals where the actuators are activated in some specified positions.

The application of the two approaches to control the one-dimensional heat equation process [5] modeled by the parabolic Takagi-Sugeno fuzzy PDE model [4], illustrates the efficiency of the pointwise control method.

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Une approche de mesure de similarité pour l'évaluation de la pertinence en recherche d'informations

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Résumé:

Un système de recherche d'information a pour objectif la restitution des informations supposées pertinentes pour l'utilisateur par rapport à sa requête. Le choix des informations à délivrer est basé sur la similarité entre les documents et la requête ,et également les centres d'intérêts de l'utilisateur ,qui forment son profil.L'analyse de ces objets nécessite souvent de mesurer la similarité entre les graphes.Dans cette communication, nous présentons une extension de mesure de similarité entre graphe,en se basant sur l'approche reposant sur les noeuds [RES 95] [LIN 98] [JIAC 97] ,et sur l'approche reposant sur la hiérarchie ou sur les distances des arcs [RADA 89] [WUP 94] [LEE 93] [EHR 04] , tout en comparant l'approche d'appariement exact avec l'appariement approximatif ,et son influence sur la pertinence dans le domaine de la RI basé sur les graphes.

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Deduction's Method Implementation to Verify the SystemC Designs

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Abstract

The SystemC language offers a mature technology to model complex embedded systems made up of software and hardware parts, is became the basic language of the most of industrial productions companies. In spite of the mathematical power of the formal verification methods of the SystemC designs, it knows limitations in terms of the systems length that effect on the speed of the check. In the previous work [1], we proposed our approach the deductions method to verify rapidly the SystemC embedded components based on extracting the executions of equivalence "paths of equivalence" through which we can deduct the satisfaction or the non-satisfaction of the systems specification and we are illustrated this on the simple synchronous FIFO component. We have implemented the deductions method to evaluate their performance and reliability on some test-benches with using binary coding to simplify the optimization part.

Index Terms—SystemC designs, Formal Verification, Automata, SPIN Model Checker

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Optimization of iris segmentation by analysis the Integro-Differential Operator algorithm and the Hough transform

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Abstract
Segmentation is a key step in the process of iris recognition system because it is through it that can extract the relevant information from the image of the human eye; the segmentation success strongly depends on the image quality because a poor capture of the iris image during the acquisition phase makes the task of segmentation rather difficult. The segmentation principle is to isolate the true region of the iris in the image, this implies to detect the iris by a circle in order to isolate it from the outside and to detect the pupil by another circle in order to isolate the region of the iris from the inside, all this leads to isolating the iris region by two circles, the two approaches that will be used in our experiments is the circular Hough transform [1] and the Integro-Differential Operator [2]. The Hough transform circular can be used to derive the radius coordinates and the center of the pupil and the region of the iris. The method of John Daugman's Integral differential operator is to use an Integral-Differential Operator for the localization iris circular and pupil regions, as well as the arches of the upper and lower eyelid. From it we draw the relevant information which is the coordinates and the size of the center of the pupil radius and the iris radius, so we can reframe the radiuses r1 and r2 to have a good segmentation. The experiment was done on the iris database Casia-iris-interval v4 [3], MMU1, MMU2 [4], Ubiris [5] and SDULMA-HCM iris database [6].

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A Prediction Model for a Targeted E-orientation academic and professional

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Abstract

Our research work addresses the problem of educational and vocational orientation. Thus, we wish to set up an E-orientation Computer System which will be based on an in-depth analysis of the factors related to the leads educational and professional orientation of the students [1]. The analysis of this issue to the redefinition of the general research question "What are the determinants that favor decision-making by E-orientation?".Which, the presence of two objectives: Identify the determinants that influence the adoption of a new information system (E-Orientation) individual and social then Set up a decision support model by E-orientation [4]. To set up this model we will make assumptions based on the theory of reasoned action (TRA) [2-3], and then we go through an observation by positioning a qualitative questionnaire sharing with social networks, SMS sending, individual interviews in collaborations with the counselor in educational and orientation Mr. Nabil Messri. After analyzing the feedback from our study sample, using vector feature we have transformed our data training into a series of numbers, and we used Machine Learning to evolve through a systematic process so that our system adapts to a model that will be implemented by a supervised classification algorithm (decision tree) contains both the inputs and the outputs results to expand our vision of decisional direction [5]. the application of the algorithm of the decision tree allows us to classify the data (explanatory variable in percentages format by applying the entropy of Shannon so that the latter can unambiguously determine the best input and outputs that can take up This will have access to a model that will later help the user to make the decision to choose his orientation [6].

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Méta-Modèle pour les Méthodes Agiles

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Abstract

Développement agile est une philosophie permettant la livraison des parties opérationnelles du projet régulièrement au client pour qu'il puisse juger de la validité de celles-ci et donc supprimer les risques d'échec en fin de projet [1]. Les méthodes agiles telles que Scrum, Extreme Programming [2-3], Feature Driven Development [3-4], Dynamic System Development [3], etc. sont des processus qui soutiennent la philosophie agile. Grâce aux méthodes agiles, le client est pilote à part entier de son projet et obtient très vite une première mise en production de son logiciel. Suite à une étude qui a été réalisé [3-5], on trouve que ces méthodes -malgré qu'ils viennent pour résoudre les problèmes de gestion des projets- ont des inconvénients par exemple, Risque de fluage portée, L'équipe exige de l'expérience et de l'engagement, etc. L'objectif de cet article est de proposer un méta-modèle générique pour le développement agile en partant par la modélisation de chaque méthode agile.

Keywords: Développement Agile ; Scrum ; Extreme Programming ; Feature Driven Development ; Dynamic System Development; Méta-Modèle.

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1st International Conference on Research in Applied Mathematics and Computer Science
ICRAMCS 2019

Etat de l'art : ETL Sémantique pour Big Data

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Résumé
Dans notre monde actuel l'exploitation Big Data caractérisé par 3V (Volume, Variété, Vitesse) reste un grand défi, d'où l'introduction de ce dernier doit être nécessaire pour un outil ETL (Extract, Transform, Load) qui est un type d'intégration de données provenant de sources multiples qui suit trois étapes (extraction, transformation, et chargement vers un entrepôt de données) d'une part, d'autre part chaque source de données à un schéma qui diffère à l'autre, ce qui s'appelle l'intégration sémantique des données ou l'intégration des données fondée sur les ontologies pour résoudre l'hétérogénéité des schémas et l'hétérogénéité de données, d'où l'objet d'un ETL sémantique, afin d'analyser les informations d'une manière transparente et de maintenir la cohérence des données de plusieurs sources de données, grâce à ces besoins nous permettons de migrer d'un ETL vers un ETL sémantique[1-2]. Dans ce papier nous présentons les travaux actuels des ETLs qui sont divisés en deux classifications : la première est l'intégration des données qui contient les outils ETL traditionnels, et les ETLs Big Data basé sur Hadoop, la deuxième qui traite ETL sémantique pour Big Data. D'après une table de comparaison des avantages et des inconvénients des différents travaux on est arrivé à proposer des idées pour une nouvelle approche d'un ETL sémantique pour Big Data.

Mots clés: Intégration Big Data, Hadoop, ETL, ETL Sémantique, Volume, Variété.

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A New Hybrid Approach for Alleviating Cold Start Issues in Recommender Systems

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Abstract

With the explosive growth of the Internet and the Web, assisting users and facilitate their access to resources that might be of their interest and that are adapted to their personal needs is a tedious task. Efficient management of large amounts of information becomes an increasingly significant challenge. Hence, recommender systems have proved, in recent years, to be a valuable asset to dealing with the problem of information overload by assisting the user and providing her with more effective access to information [1]. To this end, these systems must be able to predict users' interests based on their prior feedback. However, the cold start problem arises when the purchase or rating history is not available, which deteriorate the quality and accuracy of the recommender system.

To fill this gap, this paper proposes a novel approach to build a hybrid recommender system based on collaborative, demographic, and semantic techniques.

Keywords

Recommender Systems, Cold Start Problem, Hybrid Recommender Systems, Clustering.

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Advanced Driver Assistance System: Study and Analysis

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Abstract

Smart Car is an automobile with an advanced driver assistance system that can provide a more enjoyable driving experience, and also provide active safety features. The aim of these systems is to ensure the road safety and reduce the risk of road accidents [1].More interesting, a driver assistance system must be context-sensitive by monitoring the car and its environment in real time, and be able to sense, analyze, predict, and react according to the contextual situation: the vehicle state, the driver state, and the physical environment surrounding them[2].In this paper, we present a state of art of the researches published in the last three years on context-based driver assistance systems. There are mainly three approaches that are used in Advanced Driver Assistance System (**ADAS**): Driver Behavior Profiling [3] that tries to understand and positively impact driver behaviors; Forward Collision Warning [4]: alerts the driver to a potentially dangerous situation ahead; Intelligent Context-Aware Communication [5]: considers the impacts of different contextual information on vehicle-to-everything (**V2X**) communications. In the three approaches the context-aware plays a critical role and the inclusion of contextual factors influence the intelligence level of the Smart Car. The comparison proposed is based on the goal of the research, the context of the system (driver, vehicle, physical environment), the algorithms used (machine learning algorithm **ML**, deep-learning algorithm **DL**, game theory **GT**, Big Data etc)[6], the technology used(internet of thing sensor, Smartphone sensor, Radar, Lidar…), and the performance provided. The first analysis indicates that machine learning algorithms are widely used in the proposed solutions and specifically the support vector machine (SVM) and artificial neural network (ANN). Also, with the emergence of IoT technology, the monitoring of a complex driving context becomes possible [7].

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A Performed Intrusion Detection System for Cloud Environment Based on Deep Learning and Self-Adaptive Heuristic Search Algorithm with Optimization Strategies

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Abstract

The appealing features of Cloud Computing (CC) continue to fuel its wide-scale adoption and its integration in many sectors such industry, governments, education and entertainment. Nevertheless, the open and distributed structure of CC has resulted this class of computing prone to cyber attackers and intruders. To overcome this issue, we propose a smart approach using a self-adaptive heuristic search algorithm called "Improved Self-Adaptive Genetic Algorithm" (ISAGA) to build automatically a Deep Neural Network (DNN) based Anomaly Network Intrusion Detection System (ANIDS). ISAGA is our variant of standard Genetic Algorithm (GA), which is developed based on GA, improved through an Adaptive Mutation Algorithm (AMA) [1] and optimization strategies. During running of ISAGA, AMA allows to automatically adjust the mutation rate should be applied for any given individual from the population of ISAGA, in order to augment the chance of preserving individuals that are performing well versus the optimization problem in hand, and reduce the chance of preserving individuals that don't perform well. Whereas, the optimization strategies carried out are Parallel Processing and Fitness Value Hashing [1] that reduce execution time, convergence time and save processing power. Our approach consists of using ISAGA with the goal of searching the optimal or near-optimal combination of most relevant values of the parameters included in construction of DNN based IDS or impacting its performance, like feature selection, data normalization, architecture of DNN, activation function, learning rate and Momentum term, which ensure high detection rate, high accuracy and low false alarm rate. CloudSim 4.0 simulator platform and Kyoto 2006+ benchmark dataset version 2015 [2] were used for simulation and validation of the proposed system. The implementation results obtained have demonstrated the ability of our ANIDS to detect intrusions with high detection accuracy and low false alarm rate, and have indicated its superiority in comparison with state-of-the-art methods.

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New approach of encryption using images

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Abstract

In this paper we introduce one of the most famous problems on confidentiality of information during a traffic offense. In particular, we will propose a new diagram of confidentiality of the data captured by a radar during a traffic offense. The distribution of the data is organized by an authority which ensures the authentication between the radar which captures an image of the infracted automobile, the penalized which receives the masked image of the automobile to be able to penalize it and the automobile which will receive a message of penalization; all communications are made in real time via an unsecured channel.

Keywords: Confidentiality, Authentication, Real time, Unsecured channel, Image processing, Embedded system.

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The use of NodeMcu to detect an object inside a remote monitoring field

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Abstract

In recent years, wireless sensors networks (WSNs)[1] have been imposed as an effective means of interconnection with simultaneous communication and information processing. They allow to operate with sensors at low cost and low power consumption in various application areas such as ecosystem monitoring, smart cities[2]anddetection and monitoring of objects[3].Among the researches that have been carried out on remote surveillance of objects is the RSSI method, which is based on the measurement of the distance between two nodes as a function of the power of the signal transmitted between them. then there are three distance estimation techniques such as Curve Fitting Technique (CFT), Estimated Signal Strength(ESS) and Friis Transmission Equation (FTE). Despite the advantages of CFT over ESS and FTE, it has a problem in response time for real-time systems. To overcome this inconvenient we will exploit the presence or absence of the remote-controlled object within the area covered by the ESP8266 module.This article describes the development of a prototype to detect the presence of an object and monitor it. This prototype is based on four NodeMcu modules (a static access point that provides the WIFI network, a server, a client and a mobile access point attached to the remote surveillance object) programmed under Arduino IDE and communicating between them via the HTTP protocol. The remote monitoring of the object for a linear disposition of the nodes used is based on the existence of the mobile access point in the HTTP clientfield.

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Generic Interoperability Architecture for Internet of Things

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Abstract

Internet of Things (IoT), also known as the Internet of Objects, refers to the networked interconnection of everyday objects. For short it's a global infrastructure of the information society which provides advanced services by interconnecting physical and virtual objects. This interconnection will be existed or evolved interoperable information and communication technologies. Witch demands a complex distributed architecture with heterogeneous components, including divers' technologies, protocols, devices and applications, this diversity of technologies provide several such technologies with a special complexity. This generates a high cost at interoperability level between different IoT platforms. Therefore the Interoperability in the Internet of Things is crucial for making the communication and assuring the exchange and the connection between objects. Ergo the need for a new architecture that allows the communication between connected Object allowing to improve and to support IoT interoperability. The major aim of the paper at hand is to give a clear survey of the different technologies and protocols that exist for IoT platforms including their system architectures. We shall also provide a brand new generic IoT interoperability architecture which is mainly based on previous Meta-model of IoT Interoperability and the comparison study of IoT Interoperability Architectures along with a flexible, distributed, semantic IoT architecture in order to offer a high level of interoperability.

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Perceptual-Cognitive training on Subjective Student Performance Prediction for Graduate Students Orientation

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Abstract

Statistical studies and pedagogical assessments conducted by in-depth statistics show that initial school difficulties crystallize little by little into a failure characterized by both delays and school performance, and poor choices of the course/field to follow [1]. However, recent research in the fields of communication, psychoanalysis, genetic psychology, neurobiology and the sociology of organizations and educational practices within the family provide a grid of hypotheses capable of preventing emergence of school failure. As we are research administrators, and to meet challenges, we should collectively overcome the problem of student misdirection. The students should automatically oriented to the best and appropriate field of study on considering their skills. It is very important when students are unable to decide what is the best university cursus to follow. As part of improving the choice of orientation for newly graduated students. We propose a new method for predicting the ideal orientation of new university students based on the performance of graduate university students using artificial intelligence method. Artificial Intelligence is the science and technology of creating intelligent machines, especially intelligent computer programs. The ability of intelligent systems to perform creative functions that are traditionally considered the prerogative of man. In addition, computer science defines AI research as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals. In this work we apply this principle to propose prediction model based on combined Artificial Neural Networks ANNs [2], in order estimate the best orientation of new university students. The proposed model takes in input their actual progress in the main courses and it learn from the history of the cursus of graduate students. The program will calculate its marks and train them into the model in order to calculate the best based on performance of old students. As results a final probability of the appropriate field will be provided. The database used is APOGEE database that includes student's history of more than ten years. Experimental results show good performance in predicting best academic path.

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BOUZIR	Habib	University of Mascara	Mascara	Algeria
BRAHMIA	Hanene	Badji mokhtar annaba	Annaba	Algeria
BRAIRI	Samir	University of Tlemcen	Tlemcen	Algeria
CHAACHOUI	Ghizlane	Faculté des Sciences et Techniques	Fès	Maroc
CHAKIR	Mohamed	Faculty of Sciences-Ibn Zohr University	Agadir	Morocco
CHEBBAB	Ikhlasse	Djillali Liabes University	Sidi Bel Abbes	Algeria
CHERKAOUI	Ilias	Faculty of Sciences, Mohammed V University	Rabat	Morocco
CHERKAOUI	Abdessamad	Faculté des Sciences Ben M'sik	Casablanca	Morocco

CHIBA	Zouhair	Faculty of Sciences Ain Chock	Casablanca	Morocco
CHILLALI	Sara	Sidi Ben Abdellah University, FPT	Fez	Morroco
CHILLALI	Abdelhakim	Faculté Polydisciplinaire	Taza	Maroc
CHORFI	Salah-eddine	Cadi Ayyad University	Marrakesh	Morocco
DAKKON	Mohamed	Université Abdelmalek Essaadi	Tetouan	Maroc
DALAH	Mohamed	Faculty of Exact Sciences	Constantine	Algeria
DALI	Issam	University of Chouaib Doukkali	El jadida	Morocco
DANANE	Jaouad	Faculté des Sciences et Techniques	Mohammedia	Maroc
DAOUDI	Hamza	Ibn Khaldoun University	Tiaret	Algeria
DAOUDI	Abdelaziz	Tahri Mohammed University	Bechar	Algeria
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DIMOU	Hajira	Université Ibn Tofail	Kenitra	Maroc
DJALAL RAFIK	Hammou	Djillali Liabes University	Sidi Bel Abbes	Algeria
DJEMILI	Fatiha	University Nadjoua Mokhtar Annaba	Annaba	Algeria
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EDRAOUI	Mohamed	Faculty of Sciences Ben M'sik	Casablanca	Morocco
EL AKRI	Abdeladim	Faculté des Sciences Semlalia	Marrakech	Maroc
EL ALLALI	Mohammed	Sidi Mohamed Ben Abdellah University	Fez	Morocco
EL AMINE	Souhaila	Faculté des Sciences Ben M'Sik	Casablanca	Maroc
EL AMRI	Amnay	Faculté des Sciences Ben Msik	Casablanca	Maroc
EL AMRI	Hassan	Ecole Normale Supérieure	Casablanca	Maroc
EL ANOUZ	Khadija	Faculty of Sciences and Techniques	Al-Hoceima	Morocco
EL BENNANI	Kaoutar	Faculté des Sciences et Techniques	Béni Mellal	Maroc
EL BERRAI	Imane	Faculté des Sciences Ben M'sik	Casablanca	Maroc
EL BHIH	Amine	Faculté des Sciences Ben M'Sik	Casablanca	Maroc
EL BOUANANI	Hicham	Faculté des SJES Ain Sebaa	Casablanca	Maroc
EL BOUJAOUI	Hicham	Ibn Zohr University	Agadir	Morocco
EL BOUKARI	Brahim	EST Béni Mellal	Béni Mellal	Maroc
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EL HAIL	Khalid	Faculté des sciences Semlalia	Marrakech	Maroc
EL HAIMI	Abderrazzak	Hassan II University of Casablanca	Casablanca	Morocco
EL HAJI	Badr	Faculté des Sciences	Fès	Maroc
EL HAMDI	Issam	Faculté des Sciences	Agadir	Maroc
EL HANJRI	Adnane	Faculté des Sciences et Techniques	Settat	Morocco
EL HARAMI	Mohamed	University Moulay Ismail, EST de Meknes	Meknes	Maroc
EL HOUCH	Atmane	Ecole Normale Supérieure	Casablanca	Maroc
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EL JAMALI	Mohamed	Faculty of Sciences	Agadir	Morocco

EL KABOUSS	Abella	Faculté des Sciences	Meknès	Maroc
EL KHALIFI	Mohamed	Ibn Tofail University	Kenitra	Morocco
EL KOUFI	Amine	Faculté des Sciences Ben M'sik	Casablanca	Maroc
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EL MOUDDEN	Mustapha	Faculté des Sciences	Meknes	Morocco
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EL YOUSSOUFI	Lahcen	Faculté des Sciences Ben M'Sik	Casablanca	Maroc
ELACHKAR	Ibtissam	Faculté des Sciences Ben M'Sik	Casablanca	Morroco
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ELBOUANANI	Soumia	ENSEM	Casablanca	Morocco
ELFADILY	Sanaa	Ecole Mohammadia d'ingénieurs	Rabat	Morocco
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HABBAT	Nassera	ENSEM	Casablanca	Maroc
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HADDARI	Alla eddine	Badji-Mokhtar University	Annaba	Algeria
HALLOUMI	Mohamed	Faculty of Sciences Semlalia	Marrakesh	Morocco
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IDRISSI FATMI	Nadia	ENSA Khouribga	Khouribga	Morroco
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JAID	Amine	Faculté des Sciences et Techniques	Khouribga	Morocco
JENNANE	Mohsine	Faculté des Sciences	Meknès	Maroc
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KAHYA	Noudjoud	University Badji Mokhtar annaba	Annaba	Algeria
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KHALADI	Mohamed	Université Cadi Ayyad	Marrakech	Maroc
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KHAZARI	Adil	Sidi Mohamed Ben Abdellah University	Fez	Morocco
KHAZOU	Mohamed	Ecole Nationale des Sciences Appliquées	Marrakech	Maroc
KHCHINE	Abdelmjid	Faculté des Sciences Semlalia	Marrakech	Maroc
KHEDIF	Youssef	Faculty of Sciences Aïn Chock	Casablanca	Morocco
KHOUITI	Bouchra	Université Hassan 1	Settat	Maroc
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KOUILILY	Fatiha	Faculty of Science Ben M'sik	Casablanca	Morocco
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LABAIR	Abdelkader	Djillali Liabes University of Sidi Bel Abbes	Sidi Bel Abbes	Algeria
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LABRIJI	Hassan	Faculté des Sciences Ben M'Sik	Casablanca	Maroc
LABRIJI	Ali	Faculté des Sciences Ben M'Sik	Casablanca	Morocco
LABZAI	Abderrahim	Université Hassan II de Casablanca	Casablanca	Maroc
LAGHDIR	Mohamed	University of Chouaib Doukkali	El jadida	Morocco
LAHBABI	Salma	E. N. Supérieure d'Electricité et de Mécanique	Casablanca	Morocco
LAHRACHE	Manar	Faculté des Sciences	Meknès	Maroc
LAKHDARI	Imad eddine	University Mohamed Khider	Biskra	Algeria
LAKHEL	El hassan	Cadi Ayyad University	Safi	Morocco
LAKMECHE	Ahmed	Université Djilali Liabès	Sidi Bel Abbès	Algérie
LAKRINI	Ibrahim	Faculty of Sciences Dhar el Mahraz	Fez	Morocco
LAMICHE	Chaabane	University of M'sila	M'sila	Algeria
LAMRANI	Ilyasse	Faculté des Sciences JES	Meknes	Morocco
LANDU	Fabrice	Institut Africain de Haute Formation	Tunis	Tunisie
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LAZAAR	Oussama	Faculté des Sciences	Meknes	Morocco
LECHIHEB	Atef	Université de Tunis el manar	Tunis	Tunisie
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MAHZOUM	Soukaina	Faculté des Sciences Ain Chok	Casablanca	Maroc
MALEK	Rajae	Mouley ismail university	Meknes	Morocco
MALEK	Mustapha	Faculty of Sciences	Agadir	Morocco
MAMOUNI	My ismail	CRMEF Rabat	Rabat	Morocco
MANDYLY	Youssef	University Sultan Moulay Slimane	Khouribga	Morocco
MANIAR	Lahcen	Université Cadi Ayyad	Marrakech	Maroc
MARZOUGUE	Mohamed	Faculté des sciences d'Agadir	Agadir	Maroc
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MELLOUI	Jihane	ENSET Mohammedia	Mohammedia	Maroc
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MERZOUK	Soukaina	Faculté des Sciences Ben M'sik	Casablanca	Morocco
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OUFDIL	Khalid	ENSA	Agadir	Morocco
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OULGHAZI	Mbarek	Faculté Polydisciplinaire	Khouribga	Maroc
OUMANSOUR	Mohamed	Faculté des Sciences et Techniques	Mohammedia	Morocco
OUMOUN	Mohamed	ENSA - Marrakech	Marrakech	MAROC
OURABAH	Loubna	Hassan II University of Casablanca	Casablanca	Morocco
OURCHANE	Nadia	Ibn Tofail University	Kenitra	Morocco
OUTADA	Nisrine	Faculté des Sciences Semlalia	Marrakech	Maroc
OUTASS	Rida	Faculty of Sciences Ben M'Sik	Casablanca	Morocco
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SABBAR	Yassine	Ibn Zohr University	Agadir	Morocco
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SABIRI	Noureddine	Faculty of Sciences Ben M'sik	Casablanca	Morocco
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ZITANE	Hanaa	Faculty of Sciences	Meknes	Morocco
ZOUITEN	Hayat	University Moulay Ismail	Meknes	Morocco
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