Proceedings of Abstracts

Proceedings ISSN : 2605-7700

THE 7TH EDITION OF THE INTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE

ICRAMCS 2025

April 24-25-26, 2025

ENSA Marrakech, Cadi Ayyad University, Morocco

This volume contains only the abstracts of the communications presented at the conference. Full papers, if any, will be published separately in peer-reviewed journals or proceedings.

Conference Proceedings of Abstracts Report

ICRAMCS 2025 Proceedings ISSN: 2605-7700

FOREWORD & ACKNOWLEDGEMENTS

It is with immense pleasure and great pride that we welcome all participants, esteemed colleagues, and distinguished guests to **the 7th Edition of the *International Conference on Research in Applied Mathematics and Computer Science (ICRAMCS 2025)**. Organized by Cadi Ayyad University and held at the National School of Applied Sciences (ENSA) of Marrakech, this edition marks another milestone in our continuous effort to foster international scientific collaboration and promote cutting-edge research at the crossroads of applied mathematics and computer science.

This year, ICRAMCS 2025 has brought together scholars and researchers from **28 different nationalities**, reflecting the global reach and reputation the conference has acquired over the years. We are deeply honored by the presence of all participants who have joined us from around the world to share their expertise, ideas, and passion for scientific advancement.

We extend our heartfelt gratitude to our **keynote speakers** whose insights and academic excellence have greatly enriched the scientific program:

- **Prof. Ayman ALZAATREH**, American University of Sharjah, UAE
- **Prof. Mahamat Saleh DAOUSSA HAGGAR**, University of Ndjamena, Chad
- **Prof. Sandra FERREIRA**, University of Beira Interior, Covilhã, Portugal
- **Prof. Cemil TUNÇ**, Van Yuzuncu Yil University, Van, Turkey

Their contributions reflect the diversity and high caliber of thought leadership present at this edition of the conference.

Our sincere thanks go to the **organizing committee**, whose tireless work, dedication, and logistical coordination made this event possible. Their passion and commitment ensured the success of every detail, from the academic program to the welcoming environment.

We are also profoundly grateful to the **scientific committee** for their rigorous evaluation of submissions, ensuring that only the most promising abstracts were selected. This has contributed significantly to maintaining the academic rigor and credibility of ICRAMCS.

We appreciate the support of our **institutional partners and sponsors**, whose commitment to scientific excellence and international cooperation has been invaluable in the realization of this event.

Last but not least, we thank **all participants**, whether attending in person or online, for their enthusiasm, intellectual curiosity, and active engagement. Your contributions foster meaningful exchanges, spark new collaborations, and reinforce the global scientific community we are proud to be part of.

We look forward to future editions and hope that ICRAMCS 2025 serves as a memorable and inspiring experience for all. May this conference pave the way for new discoveries, long-lasting partnerships, and impactful innovations in applied mathematics and computer science.

Sincerely,

On behalf of the Organizing Committee of ICRAMCS 2025
Prof. Youssef EL FOUTAYENI
Cadi Ayyad University, Marrakech-Morocco

SCIENTIFIC SESSIONS

- Applied Mathematics to Economics and Finance
- Biomathematics
- Dynamical systems and Differential Equations
- Fixed Point Theory and Applications
- Functional Analysis & Linear Algebra
- Operations Research & Optimization
- Optimal Control Theory and Applications
- Probability & Statistics and Stochastic Analysis
- Mathematics-Other
- Artificial Intelligence and Machine Learning
- Big Data and Data Mining
- Data Science and its Applications
- Deep Learning and Artificial Intelligence
- Internet of Things and Smart Cities
- Information Security, Cloud and Networks
- Software Engineering and Information Systems
- Computer Science-Other

ORGANIZING COMMITTEE MEMBERS

Naceur ACHTAICH, Hassan II University of Casablanca, Morocco

El mustapha AIT BENHASSI, Cadi Ayyad University, Morocco

Abdelhadi AIT DADS, Cadi Ayyad University, Morocco

Mahmoud BAROUN, Cadi Ayyad University, Morocco

Said BOULITE, Cadi Ayyad University, Morocco

Youssef EL FOUTAYENI, Cadi Ayyad University, Morocco

Khalil EZZINBI, Cadi Ayyad University, Morocco

Mohammed HALLOUMI, Cadi Ayyad University, Morocco

My Ihassan HBID, Cadi Ayyad University, Morocco

Mohamed KHALADI, Cadi Ayyad University, Morocco

Lahcen MANIAR, Cadi Ayyad University, Morocco

Olivier MONGA, IRD, France

INTERNATIONAL PROGRAM COMMITTEE

Mohamed AIT BABRAM, Cadi Ayyad University, Morocco

Mohamed AMOUCH, Chouaib Doukkali University, Morocco

Chaouki AOUITI, University of Carthage, Tunis

Pierre AUGER, IRD Paris, France

M.A. AZIZ-ALAOUI, University of Le Havre Normandy, France

Aicha BOUNAIM, Schlumberger, Norvege, Norvege

Hamid BOUNIT, Ibn Zohr University, Morocco

Jamal BOUYAGHROUMNI, Hassan II University of Casablanca, Morocco

Zaki CHBANI, Cadi Ayyad University, Morocco

Mohamed EL ALAOUI TALIBI, Cadi Ayyad University, Morocco

Hassan EL AMRI, Hassan II University of Casablanca, Morocco

Abdelhaq EL JAI, University of Perpignan, France

Samira EL YACOUBI, University of Perpignan, France

Said HADD, Ibn Zohr University, Morocco

El Haj LAAMRI, University of Lorraine, France

Laila MOUSSAID, Hassan II University of Casablanca, Morocco

Youssef OUKNINE, Cadi Ayyad University, Morocco

Mostafa RACHIK, Hassan II University of Casablanca, Morocco

Abdelaziz RHANDI, Cadi Ayyad University, Morocco

Hassan RIAHI, Cadi Ayyad University, Morocco

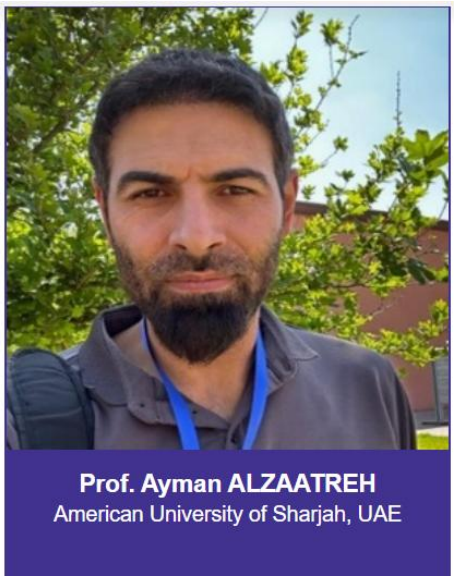
Mohamed Aziz TAOUDI, Cadi Ayyad University, Morocco

Cemil TUNC, Van Yuzuncu Yil University, Turkey

Noura YOUSFI, Hassan II University of Casablanca, Morocco

Mehdi ZAHID, Cadi Ayyad University, Morocco

SPEAKERS

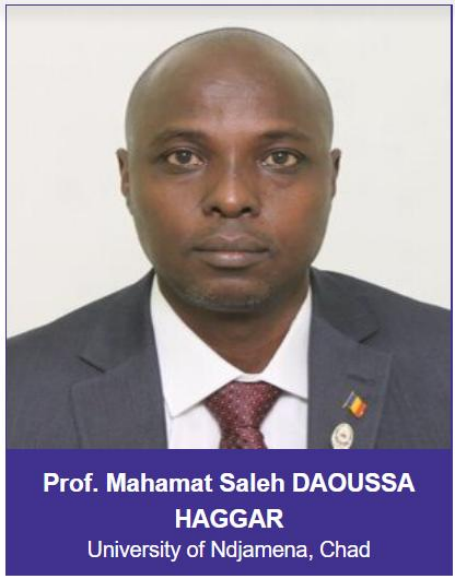


FEATURE RANKING WITH RELATIVE BELIEF: A BAYESIAN FILTER METHOD FOR MIXED-TYPE FEATURES IN CLASSIFICATION PROBLEMS

American University of Sharjah, Sharjah, UAE
aalzaatreh@aus.edu

Abstract

Feature selection is a crucial step in data mining and machine learning applications, particularly when dealing with high-dimensional datasets. It helps mitigate the curse of dimensionality, improve model performance, and reduce computational complexity. Among the available approaches, filter methods stand out for their efficiency, as they evaluate the relevance of features independently of the learning algorithm. In this talk, we present a Bayesian filter-based feature selection method based on the Relative Belief Ratio. This approach is employed to rank and select quantitative features based on the strength of evidence they provide in relation to the target variable, without requiring access to the learning model. The method is applied to both binary and multi-class classification problems. Additionally, the approach is extended to handle qualitative features, enabling a broader application of the proposed filter method in real-world datasets where non-numeric attributes are common. Several benchmark datasets are used to validate the effectiveness of the proposed method, showcasing its robustness and scalability in diverse classification settings.



A MATHEMATICAL MODEL FOR INVESTIGATING THE THERAPEUTIC RESPONSE OF REPAGLINIDE AND METFORMIN IN TYPE 2 DIABETES PATIENTS

University of NDjamena, NDjamena, Chad
msdhaggar@gmail.com

Abstract

In recent decades, several mathematical models of the glucose-insulin system have been developed to study the complications of diabetes and to diagnose and treat the disease by predicting outcomes. However, in this work, we focus on the interaction between two drugs used in the treatment of type 2 diabetes when lifestyle measures alone are insufficient to control blood glucose levels: metformin and repaglinide. Initially, we combine these two treatments using a new approach of a mathematical model of the glucose-insulin system that integrates the effects of these drugs. The model parameters are then estimated using an inverse optimization problem and available data. The response of metformin and repaglinide in type 2 diabetes patients is investigated through numerical simulations. The results show an increase in glucagon and insulin concentrations, as well as a decrease in glucose concentrations in the heart, tissues, and liver. These findings support the mechanism by which repaglinide lowers blood glucose levels by stimulating insulin release from the pancreas, while metformin helps reduce blood sugar by improving the body's response to insulin.

EXTENDING THE WEIBULL DISTRIBUTION FOR NON-MONOTONE FAILURE RATES

University of Beira Interior, Covilhã, Portugal
sandraf@ubi.pt

Abstract

The widespread use of the Weibull distribution in reliability and survival analysis has led statisticians to seek improved models that can handle data exhibiting non-monotone failure rates. As the typical Weibull distribution is somewhat limited, as it can only model hazard functions that are monotonically increasing or decreasing, in this talk we present an extension to obtain failure rates with bathtub-shaped and unimodal showing that this extension offers flexibility compared to the traditional Weibull distribution and it is especially useful when we are working with real-world data that might not fit the simple assumptions of the Weibull distribution. This presentation is substantiated by model comparisons and graphical illustrations that complement the theoretical foundation. The interest of the recommended distribution is confirmed through a real data set.

UNIQUE SOLUTIONS FOR INTEGRAL EQUATIONS, INTEGRO- DIFFERENTIAL AND CAPUTO FRACTIONAL DIFFERENTIAL EQUATIONS WITH DELAY: PROGRESSIVE CONTRACTIONS

Van Yuzuncu Yil University, Van, Turkey
cemtunc@yahoo.com

Abstract

In this study, first we handle nonlinear integral and integro-differential equations with delay. We investigate global existence and uniqueness of solutions of the considered equations by fixed point method using progressive contractions of T.A. Burton. We prove some new results including sufficient conditions with regard to global existence and uniqueness of solutions of the considered equations. We provide an example for illustrations.

Second, we handle a nonlinear Caputo fractional differential equation (CpFrDE) including multiple variable delays. We study uniqueness of the solutions of the CpFrDE under consideration. Here, we apply the method of progressive contractions on CpFrDEs including multiple variable delays. The vital point of the method of progressive contractions is that it is a very flexible idea to discuss the uniqueness of solutions for various mathematical models. We also provide an example to demonstrate how the outcome can be applied.

The present study has new contributions to the qualitative theory of integral and integro-differential equations and fractional differential equations.

TABLE OF CONTENTS

FOREWORD & ACKNOWLEDGEMENTS	**i**
SCIENTIFIC SESSIONS	**iii**
ORGANIZING COMMITTEE MEMBERS	**iii**
INTERNATIONAL PROGRAM COMMITTEE	**iv**
SPEAKERS	**v**

ABSTRACTS [MATHEMATICS]

EL MOUADINE HAMZA, L'image des opérateurs élémentaires	1
EL FADIL EL IDRISSI ANWAR, YAACOUBI ABDELHAK, Mathematical Analysis of the Effects of Food Influencers on Consumers Food Choices	2
BABA NOSSAIBA, AGMOUR IMANE, EL FOUTAYENI YOUSSEF, ACHTAICH NACEUR, Real Case Study of Moroccan Tri-trophic Model with Alternative Food	3
LAHBOUB MOHAMED, ABCHIR CHAKIB, Existence de solutions d'équations présentant des non-linéarités asymétriques	4
ESSOFI MOHAMED, BOUALLALA MUSTAPHA, OUAFIK YOUSSEF, Analysis and Numerical Approximation of a Frictional Contact Problem arising in Thermo viscoelasticity	5
DIALLO MOHAMADOU MOR DIOGOU, COLY CHERIF MAMINA, Generalizing families of algebraic points of quotients of Fermat curves C_(r,r) (p)	6
BOUMNIDEL SANAA, A study of some operators defined on Banach spaces	7
FERREIRA DARIO, FERREIRA SANDRA, Advanced Modeling of Temporal Dynamics Using Time-Adaptive Linear Mixed Models	8
ABDELALIM SEDDIK, THE STRONGLY COHOPFIAN ABELIAN GROUPS IN THE CATEGORY OF ALGEBRAICALLY COMPACT ABELIAN GROUPS	9
AHMAD ABDULAZIZ GARBA, BELLO HARIS JAAFAR, UCHE DAVID UGOCHUKWU, Simulation of a liquid chromatographic reactor using an isothermal nonlinear equilibrium model for gradient elution considering Bi-Langmuir adsorption	10
BAROUDI MOHAMED, IMANE SMOUNI, HICHAM GOURRAM, ABDERRAHIM LABZAI, MOHAMED BELAM, Optimizing Control Strategies for Monkeypox through Mathematical Modeling	11
ACHIK YAMNA, BABA NOSSAIBA, EL FOUTAYENI YOUSSEF, ACHTAICH NACEUR, Boosting LCP Solver Performance with Accelerated Updates	12
TANJAOUI MOHAMMED, KARMOUNI MOHAMMED, Polynômes orthogonaux pour un produit scalaire de Sobolev	13
SALL MOUSSA, FALL LANDING, SOW DJIBY, ON HOLLOW-LIFTING SEMIMODULES	14
FALL MOUSSA, Algebraic points of degree d on some quotients of Fermat curve of degree 11	15
CHAHER MOHAMED, LAMNII ABDELLAH, NOUR MOHAMED-YASSIR, A cubic B-spline quasi-interpolation approach for singularly perturbed time-dependent parabolic convection-diffusion problems	16
OUSSARHAN ABDESSAMAD, On the graph convergence of subdifferentials of paraconvex functions	17
EL KHALFI YOUSSEF, SETTATI ADEL, LAHROUZ AADIL, MOURAD EL IDRISSI, Stochastic Gilpin-Ayala Model in Polluted Environment with Markovian switching	18

AIT EL HARCH ILHAM, OUTAAOUI KHALID, ELFOUTAYENI YOUSSEF, Mathematical Modeling for Fisheries Management: The Sustainable Harvesting of Three Major Marine Species in Morocco	19
OULTOU ABDERRAHMANE, BENAISSA HICHAM, A coupled system of fractional history-dependent hemivariational inequalities arising in contact mechanics	20
FEKIH ASMA, HAJJI MOHAMED KARIM, Optimizing Flow Time and Carbon Emissions in Flexible Job-Shop Scheduling with Mixed-Integer and Constraint Programming	21
EL HAITAMI ADIL, Stochastic analysis of epidemic model with relapse incorporating Ornstein-Uhlenbeck process	22
EL MAJOUTI ZAHRA, Modified moving least squares meshless method for solving multidimensional mixed integral equations	23
LMANGAD RACHID, FAIZ ZAKARIA, BENAISSA HICHAM, Three-Dimensional Asymptotic Analysis of a Bingham type fluids with Tresca law and Thermal Effects	24
TERGUI IKRAME, KISSI BENAISSA, KHATIB HAMZA, AAYA HASSAN, Études numériques du comportement vibratoire de sols sous écoulement turbulent : Application à l'érosion interne de digues	25
MEHSIN ATTEYA, The Cracovian product with the right multiplication over the matrices	26
RETBI ABDERRAHMAN, Unconditionally Converging Operators	27
RAHMANI NOUR-EDDINE, SERRAJ TAOUFIK, Reducing Secret Key Size in HAWK via Algebraic Techniques	28
AGHDAOUI HASSAN, Deep learning and optimal control techniques for fractional derivative models in epidemiology	29
BELLFKIH EL MEHDI, Identification of Involutory MDS Matrices Through Evolutionary Algorithms	30
BOUKHIRA AYOUB, BENAISSA HICHAM, Existence results for the 2d-elastic isotropic frictional contact problem	31
ASSILA KHAIREDDIN, LOUARTITI KHALID, Zero-Divisors in Commutative Rings: A Graph-Theoretic Perspective	32
ASSALI EL ABED, Anti-synchronization of quaternion-valued neural networks with inertial term and proportional delay via a direct technique	33
EL BAKKIOUI KHALID, SETTATI ADEL, Étude de l'effet des perturbations par sauts sur la dynamique stochastique des modèles SIRS	34
ALMUSAWA MUSAWA, ALMUSAWA HASSAN, Fractional analysis of nonlinear dynamics in Korteweg-de VriesBurgers' and modified Korteweg-de Vries Equations	35
AHMADINI ABDULLAH, Design of a EWMA Control Chart by adaptation of Smoothing Constant based on a Function of estimated shift	36
RAMADANE ABDERRAZAK, HASSOUNA SAAD, TIMESLI ABDELAZIZ, AZOUANI ABDERAHIM, A new domain decomposition strategy based on the hybrid FE-MESHLESS method	37
BELMAHI HAJAR, Geometric Analysis of Black Hole Shadows in Einstein-Maxwell-Dilaton Theory	38
OUIDIRNE FATIMA, SELF-SIMILAR SOLUTIONS FOR ACTIVE SCALAR EQUATIONS IN FOURIER-BESOV-MORREY SPACES	39
ABDELBAR ELMANSOURI, Contrôle optimal dans un modèle mathématique de tricherie aux examens de certification	40
FIHI HIBA, MAMOUNI ABDELLAH, OUARGHI KHALID, On derivations and symmetric elements in prime rings with involution	41
MENCHIH MANAL, HILAL KHALID, KAJOUNI AHMED, On gamma-Semigroup Dynamics for Specific Conformable Partial Differential Equations	42
MOUSSAFIR OUMAIMA, EZZINBI KHALIL, AFOUKAL ABDALLAH, Asynchronous exponential growth for semi-linea differential equations with nondense domain: Application to population dynamics	43

JAOUANE MOHAMED REDA, EL KARKRI JAAFAR, A generalized fuzzy-TOPSIS-based framework for (SRI) portfolios selection	44
ELBARBOUCHI AHMED, BOUMAZGOUR MOHAMED, CHRAIBI KAADOUD MOHAMED, New estimates of the q-numerical radius of Hilbert space operators	45
KOUACH YASSINE, EL ATTAR ABDERRAHIM, An optimal coherent security system for a non-life insurance company using particle swarm optimization (PSO) algorithm	46
GOURTY ABDELMAJID, IGHACHANE MOHAMED AMINE, KITTANEH FUAD, New improvements of some classical inequalities	47
KHALOUQI DOUNIA, IDRISSI FATMI NADIA, Modeling HPV with Cervical Cancer and HIV with AIDS Diseases Co infection	48
OUSKHNID IDRISS, BOUARICH ABDSLAM, An isoperimetric problem with a potential perturbation of regular kernel	49
LOURINI ABDELLAH, EL AZZOUZI MOHAMED, LAABISSI MOHAMED, Boundary controllability for Caputo fractional differential equation	50
MAKHLOUKI NADIA, STOCHASTIC VASICEK MODEL PROCESS TO MODEL AND FORECAST WATER PRODUCTIVITY IN MOROCCO	51
EL MEZEGUELDY REDOUANE, OUZAHRA MOHAMED, Optimality conditions for a class of bilinear control problems	52
EL BILALI MOHAMMED, MOHAMMED MOUÇOUF, On m-EP operators	53
RACHID GUIRHIR, A relationship between Favard space and admissibility for a analytic resolvent family of an integral volterra system	54
ABDELLAOUI MOHAMMED, HICHAM REDWANE, Asymptotic behavior of solutions for parabolic problems of fractional type and sign-changing measure data	55
TASSI NADA, AZRAR LAHCEN, FAKRI NADIA, Micromechanical Modeling of high temperature dependent thermo-elastic	56
AIT BRAHIM ABDESSAMAD, the new fractional calculus and its applications	57
OUKASSOU HAJAR, Regional Optimal Control Problem of Riemann Liouville Time Fractional Bilinear Systems with Bounded Control Operator in a Finite Time Horizon	58
BELHADJ MAHA, Solving Fractional Integral Equations via Proinov's Fixed Point Theorem	59
KHOULDI YASSINE, IDRISSI FATMI NADIA, ABDELALIM AYOUB, Continuous propagation of panic in flight: Modelling, analysis and optimal time control	60
TATOUTI SAMIRA, The generalized of 2-frame in 2-Hilbert space	61
SAIDI ASMA, MAZGOURI ZAKARYA, On quantitative stability for parametric equilibria with tri-functions	62
KADYRI ABBES, FARHANE MEHDI, KANDOUSSI KHALID, SOUHAR OTMANE, Identifying Major Influences on Photovoltaic Panel Efficiency via PCA	63
BEN SLIMANE KAMEL, TMAR ZIED, BESBES MONGI, An Enhanced Cuckoo Search Algorithm with Lévy Flight for Efficient High-Order System	64
AAIBID MAHJOUB, EL KARKRI JAAFAR, Physics-Informed Neural Networks (PINNs): Progress, Challenges and Future Directions	65
HASSOUNE ELMEHDI, Entropy solution for some nonlinear d elliptic p()-Laplacien problem with Right-Hand Side Measure	66
EL AZRI ABDENBI, NAFIDI AHMED, MERBOUHA ABDELKRIM, Statistical inference for a powers stochastic Rayleigh diffusion process, simulation and prediction	67
TALHA ABDESLAM, Existence Results for Nonlinear Parabolic Problems with Lower Order Terms in Musielak-Orlicz Spaces	68
MOHAMMED BOUASABAH, Stochastic Processes as Classification Algorithms in Stock Market Prediction	69
TMAR ZIED, BEN SLIMANE KAMEL, BESBES MONGI, Reinforcement Learning-Based Pole Placement for Complex Dynamic Systems: A Feasibility-Oriented Approach Reduction	70

ELAMRAOUI OMAR, ESSOUFI EL HASSAN, ZAFRAR ABDERRAHIM, Applications of Variational Inequality and Reaction-diffusion Equations in Epidemiology	71
EL BAROUDI MOHCINE, Stochastic Optimal Control in Epidemic Dynamics: Applications To Public Health	72
RAFIK MOHAMED, Stochastic Modeling of Disease Spread: SIS Model	73
ADETUTU OLAYIWOLA MATTHEW, Comparison of Bayesian and Frequentist Approaches in Nominal Item Response Theory Modelling	74
TARIK LAHCEN, An Extension of Young's Inequality in the Framework of s-Convex Functions	75
BOURZIK DOUNIA, AKHARIF ABDELHADI, LMAKRI AZIZ, MELLOUK AMAL, Gaussian and Rank-based Optimal Tests for Non Linear Regression Model	76
GOURRAM HICHAM, BAROUDI MOHAMED, ISSAM SAHIB, IMANE SMOUNI, ABDERRAHIM LABZAI, MOHAMED BELAM, ANALYSIS OF THE STABILITY OF A MATHEMATICAL MODEL FOR MEASLES	77
ERRACHIDI MOHAMMED, EL MAROUFY HAMID, EL OMARI MOHAMED, Moments method for diffusion processes with random effects with real application	78
JABER TAWFIK, Optimal control problem for a bilinear vibrating plate equation with bounded distributed controls	79
MOHAMED NEBGHOUHA, DIEYE MOUSTAPHA, SÉNE ABDOULAYE, Exponential decay for mild solutions of second order integro-differential equations with delay	80
KARIMINE ABDELATIF, TAKI REGRAGUI, BAHRAOUI ZUHAIR, Analysis of the Dynamical Behavior of a Stochastic SEIS Epidemic Model with Nonlinear Innate Immunity	81
HAMID BEN.HSSAIN, AZIZ ELBOUR, ABDELHAK EL HADDOUCHI, Generalized Common fixed point in fuzzy metric spaces and application to an integral equation	82
EL FADOUAKI MOHAMED, LMOU HAMID, HILAL KHALID, KAJOUNI AHMED, Existence result for a system of ψ-Caputo-type hybrid fractional differential inclusions	83
FAIZ AMINE, EDRAOUI MOHAMED, ADIL BAIZ, BOUZKOURA KHADIJA, JAMAL MOULINE, Best proximity point theorems for tricyclic diametrically contractive mappings	84
ASERRAR YOUSSEF, An extension of Van Velck's functional equation on semigroups	85
HARIR ATIMAD, Fuzzy complex conformable differentiation	86
EL ISSAOUY YASSINE, Stabilityof Fourth-Order Partial Differential Equations	87
MAKKI NACIRI ABDERRAHIM, Counting primitive kth Roots of Unity Modulo n	88
KHAN SALMA, IZID MALIKA, EL HAIMI ABDERRAZZAK, AHARMIM BOUCHRA, OUAZZANI CHAHDI AMINA, Translation surfaces generated by two relatively normal-slant helices in Euclidean 3-space	89
SADKI MARYA, ALLALI KARAM, Stochastic two-strain epidemic model with saturated incidence rates driven by Lévy noise	90
OSMAN TUNÇ, Improved qualitative results for retarded integro-differential equations	91
AARABATE OUMAIMA, BALATIF OMAR, Dynamic Conduct of a Stochastic Unemployment Model	92
KHARFATI KHAOULA, ROUBI AHMED, BLOCK COORDINATE DESCENT METHODS OF CENTER	93
BENAMARA IBTISSAM, A Mathematical model for the interaction between Covid-19 and Tuberculosis dynamics	94
EL HASSANI MUSTAPHA, EL HARFI ABDELHADI, EL MOURCHID SAMIR, Trajectory tracking problem for 2-D Heat Equation	95
ASOGWA OLUCHUKWU, OTEKUNRIN OLUWASEUN, EZE NNAEMEKA, On the robustness of Augumented Box-Behnken Designs to two missing Observations	96
FAKHRAOUI MERYEM, BAKHADACH IDRIS, MELLIANI SAID, Pythagorean Fuzzy Sublattices and Ideals	97
BOUZID EL HOUSSINE, BEN AMMA BOUCHRA, MELLIANI SAID, CHADLI LALLA SAADIA, Qualitative results for intuitionistic fuzzy Cauchy Problem	98

FAIZ MARIEM, Stability Analysis of a Mathematical Model for Malaria Transmission	99
EL MOURABIT CHAIMAE, IDRISSI FATMI NADIA, Stability and sensitivity analysis of HIV Co-Infections with HCV, HBV, and TB	100
ZOUHRI SAMIRA, Multi cell discrete-time SIRI epidemic model with travel restrictions and vaccination controls	101
RAJI ABDERRAHMANE, Commutativity of prime rings and Banach algebras with generalized (β, α)-derivations	102
HAMMOUTI OMAR, Spectrum of discrete 2n-th order difference operateur with periodic boundary conditions and its applications	103
RHOLAM OUALID, LAARICHI YASSINE, BARMAKI MOHAMMED, Integral inequalities for log (m; h1; h2) convex stochastic	104
CHAMLAL HASNA, TAYEB OUADERHMAN, MESKAOUI MOUHSIN, Comparative Study of Information-Theoretic Multi-Label Feature Selection	105
AIT LHOUSSAIN HAMID, Numerical Analysis of Air Pollution Dispersion from Steady Single Point Emission Source	106
ERRAKI MOHAMED, Feedback stabilization of non-homogeneous semilinear neutral systems with distributed delay	107
MOUJANI HASNA, KASSIDI ADERRAZAK, EL MFADEL ALI, ELOMARI M'HAMED, On The Existence of Weak Solutions for Double-phase-Laplacian-Like Systems	108
LFOUNOUNE ABDELLATIF, K-frames in super Hilbert c*modules	109
EL BAZ AYAD, Les fondements mathématiques de l'Analyse en composantes principales normées et applications	110
ALI KHELIL KARIMA, Existence of solutions of fractional equation with fractional integral boundary conditions	111
GÖZEN MELEK, Enhanced Qualitative Results for Nonlinear Integro-Differential Equations of Higher Order	112
HIMMI HANANE, OUMOUN MOHAMED, A constructive method for feedback stabilization of a collection of stochastic nonlinear systems	113
BELLACHE ZINEB, EL BOUANANI HICHAM, Study on the Behavior of Net Asset Values of Diversified Mutual Funds	114
BRAHIM EL OMARI, HAJJI YOUSSEF, HJIAJ HASSANE, JAMIAI ISMAIL, Entropy Solutions for Some Elliptic Unilateral Problems with Degenerate coercivity	115
BENCHEIKH KHADIJA, Mathematical Model for Heroin Consumption Spread with Stability Analysis and Control Strategies	116
ELKHALLOUFY KHADIJA, MENCHIH MANAL, HILAL KHALID, KAJOUNI AHMED, Semigroup Dynamics of a Conformable Spatial PDE Chaos and Hypercyclicity	117
DIALLO HAMIDOU A, SALLET GAUTHIER, EZZINBI KHALIL, OUTADA NISRINE, Properties of 'Kermack KcKendrick' like models	118
AKRID THAMI, ELAZZOUZI ABDELHAI, OUHINOU AZIZ, Asymptotic almost periodicity of bounded solutions for some partial functional differential equations with delay	119
ANNOUAOUI TAIB, CHAKIB ABDELKRIM, KHALIL IBRAHIM, Numerical shape optimization process based on a new shape derivative formula constrained by a semi-linear PDE	120
ALOUAT MOHAMED, EL BOUJAOUI HICHAM, RAGHAY SAID, Universal Approximation for Partial Differential Equations: Bridging Theory and Practice with Physics-Informed Neural Networks	121
BOURHIM FATIMA-EZZAHRA, EL MFADEL ALI, ELOMARI M'HAMED, Couples System of Nonlinear Impulsive Hybrid Differential Equations with Linear and Nonlinear Perturbations Involving psi-Caputo Fractional Derivative	122
MALOUH MAHACINE, M'HAMED ELOMARI, BOUAOUID MOHAMED, Study of Mild Solutions for Fractional Differential Inclusions under Nonlocal Conditions Involving the psi-Caputo Derivative	123

LOUAKAR AYOUB, VIVEK DEVARAJ, KAJOUNI AHMED, HILAL KHALID, Controabillity analysis of Hilfer fractional stochastic pantograph differential equation with fractional Brownian motion and Poisson noise	124
SOUAD MAARIR, EL HADFI YOUSSEF, Optimal Embeddings and Interpolation: Connecting Sobolev Spaces and Their Norms	125
JAHID OUMAYMA, ABOUELHANOUNE YOUNES, AHMED BOUJRAF, Numerical Simulation of Biphasic immiscible flow in porous media	126
SETTAR ABDELJALIL, CHEGDAL SARA, BENRHMACH GHASSANE, Log-volatility Models for Modelling Financial Return Series in the Presence of Zeros: a Comparative Study	127
FARHANE MEHDI, KADYRI ABBES, KADDAR ABDLILAH, SOUHAR OTMANE, Mathematical Advances in 3D Numerical Analysis for Air Pollution Dispersion Models	128
OUTAIK MOHAMED, BAHRAOUI ZUHAIR, Mathematical Analysis of a Stochastic Epidemic Model: Existence, Uniqueness, Persistence, and Control	129
KAOURI SABAH, ABOUNOUH MOSTAFA, AL MOATASSIME HASSAN, New absorbing boundary conditions for the Schrödinger equation	130
KHAIDER BRAHIM, LAGHRIB AMINE, HADRI AISSAM, AFRAITES LEKBIR, On the study of non-smooth nonconvex optimization problem for image restoration by learnable descent algorithm and Plug-and-Play method	131
AMRANI ZERRIFI SALOUA, DOGHMI AHMED, A generalization of the Nash equilibrium solution	132
CHAHRAZED MESSIKH, General Energy Decay of a Thermoelastic Timoshenko System of Type III with Memory Damping	133
MANGA CLÉMENT, CISSE OUSMANE, DIATTA JEAN TOSSE, SANE IBRAHIMA, Coupling Homogenization and Large deviation Principle in a local time under Non Linear Wentzell Boundary Conditions	134
TYR OTHMAN, Absolute convergence of Mellin transforms	135
EL BAZ MUSTAPHA, AOURAGH MY DRISS, Existence and stability results of a thermoelastic nonlinear shear beam	136
NGAMOUYIH MOUSSATA CYR - SÉRAPHIN, Simulation numérique de la diffusion d'un pollutant dans un cours d'eau	137
BELGRAOUI YOUSSEF, BELMAATI AZIZA, Estimating parameters of stochastic SIaIs model for HIV transmission using the ensemble Kalman filter	138
BABRHOU YASSINE, KHADIJA CHANNAN, EL BOUKARI BRAHIM, HILAL KHALID, KAJOUNI AHMED, Dynamic Analysis of a Fractional S1S2IQR Epidemic Model with Standard Incidence Rate	139
GHOLALI FADWA, New generalization of the C-condition for (ξ; ζ) mappings in Cauchy problem conformable on modular metric spaces	140
EL MAHRAOUI ALI, EL AMROUSS A., KISSI FOUAD, Existence of Solutions for a Class of Superlinear Anisotropic Robin Problems with Variable Exponent	141
MOUZOUN AZIZ, ZEGLAMI DRISS, A functional equation originated from the product in a cubic number field	142
SABIQ AICHA, BOUJIJANE SAMIR, KHALIL EZZINBI, Viral Diffusion-Dynamics Model with Cellular Immune Response	143
EL HAMMANI MOHAMMED, DOUIRI SIDI MOHAMED, EL HARRAKI IMAD, Mathematical and Numerical Analysis of Chemotherapy Resistance in Tumors: Modeling Integrating Darwinian, Lamarckian, and Microvesicle-Mediated Mechanisms with the WENO5 Scheme	144
LADIB MOHAMED, OUHINOU AZIZ, The impact of tracing, monitoring, and hospitalizing on epidemic dynamics: an application to Ebola	145
SADIK AHMED, Neural Network Approach for Estimating Initial Conditions and Parameters in ODE Models: Application to an SEIuIdR Epidemiological Framework	146

ISMAGUE FATIMA, AFRAITES LEKBIR, HAKIM ABDELILAH, SRATI MOHAMED, An inverse problem for determining the initial condition in a time-fractional diffusion equation using the ADMM method	147
MAHZOUM SOUKAINA, Spectral properties of skew-adjacency matrices in tournaments	148
FARHI SAMIR, EL BOUANANI HICHAM, Transferts de fonds et cycles économiques au Maroc : une analyse empirique	149
ARJDAL ISMAIL, EL HARFAOUI ECHARIF, Handling High-Dimensional Mixed Data: A Penalized Regression Framework with SCOPE and Adaptive Encoding Strategies	150
ECH-CHAKOURI ALI, On Supercyclicity of Linear Relations	151
SADOUK EL MOSTAFA, BENCHIHEB OTHMANE, AMOUCH MOHAMED, Recurrent Tuples and Backward Shifts on Double Sequence Spaces	152
CHEDDOUR AYOUB, KRICHE MOHAMMED, ELAZZOUZI ABDELHAI, Comparison of Two Algorithms for the Finite Volume Method	153
OUNAMANE SAID, SADEK LAKHLIFA, BOUCHRA ABOUZAID, SADEK EL MOSTAFA, Numerical technique for solving tempered variational problems	154
KADDIRI ADNANE, A study of a class of nonlinear double-phase parabolic systems: An example from advances in reaction-diffusion models (ARD)	155
BAZIRHA ZAROUAL, AZRAR LAHCEN, TPFA method for the two-dimensional Burgers' equation	156
DADES ABDELAALI, The continuous Mehler–Fock wavelet packets transform	157
MAAQOUL SALAHEDDINE, BELHADJ HASSAN, Efficient Splitting Method for the Korteweg–De Vries Equation	158
AL-RABEEI BORHAN, KASSOU FOUZIA, GHAFIRI ABDESSAMAD, Study of Water Seepage in Al-Wahda Dam and Its Impact on the Stability of the Earth Dam	159
SADEK LAKHLIFA, On cotangent fractional operators and their properties	160
MOKTAFI HOUDA, KHABAOUI HASSAN, EL FAHRI KAMAL, About the class of bounded-E(^a) operators	161
EL KHATIB BILAL, SETTATI ADEL, LAHROUZ AADIL, Network Scale Effects on Stochastic SIS Epidemic Persistence and Extinction	162
SMOUK ALI, RADID ATIKA, Numerical Analysis and Energy Decay of Timoshenko Linear Beam System	163
ZOZAN OKTAN, On the stability of a stochastic delay differential equations of fourth order	164
EL FARRAGUI MERYIEME, SOUHAR OTMANE, C GEORGIOU GEORGIOS, Multiresolution analysis for solving viscoelastic fluid flow with slip boundary conditions	165
SAHIB ISSAM, Mathematical Modeling and Analysis of Fast Food Consumption Dynamics	166
MOUTALIBI CHAIMA, AGHRICHE AHMED, EL HADFI YOUSSEF, Dynamics and numerical analysis of a Fractional Order Host-Parasite Model with Diffusion	167
NOUREDDINE ABDELOUAHAB, RAMADANE ABDERRAZAK, MOUZZOUN MILOUD, Comparative Analysis of Seismic Strengthening Systems for Existing Structures: Viscous Fluid Dampers vs Traditional Bracing	168
HIBBAH EL HOUCINE, MCMC tools for Model Uncertainty In Environment Emission Analysis	169
CHAKROUNE YASSINE, NAFIDI AHMED, Three-Parameter Estimation of the Stochastic Generalized Rayleigh Diffusion Process	170
ASKOURAYE NAJIB, AITALIOUBRAHIM MYELKEBIR, Viability results for first-order functional differential inclusions with ϕ-Laplacian in Banach spaces	171
ZERBIB SAMIRA, HILAL KHALID, KAJOUNI AHMED, Study of psi-Hilfer Fractional Fuzzy Hybrid Integro-Differential Equations	172
RACHAD HOUSSAME, BAHLOUL RACHID, N_alpha^F -FRACTIONAL SEMI-GROUPS OF OPERATORS	173

YASSIR ABDELLATIF, EL MOUMNI MOSTAFA, Existence of weak solutions for a (p(x), q(x))-elliptic system via topological degree	174
SECK CHEIKH TIDIANE, DJALOUD TOIHIR SOULAIMANA, A Functional Principal Component Analysis Approach to Conditional Copula Estimation	175
BOUHAMED ABDELHAK, Optimal Control Problem for a Semilinear Wave Equation	176
SABAH LAARIF, EL HADRI ZOUHAIR, A New Estimation Approach for Structural Equation Models	177
MOUSTAID MOHAMED BILAL, DALI ISSAM, Approximate Optimality and Approximate Duality for Multiobjective Fractional Interval-valued Problems	178
LAOUINA AZIZA, A New Approach to Modeling Multidrug-Resistant Tuberculosis	179
EL HABIB BANOUISSE, ELOMARI M'HAMED, AZIZ EL GHAZOUANI, Existence, Uniqueness, and Stability of Solutions for Nonlinear Neutral Volterra-Fredholm Integro-Differential Equations with Caputo Fractional Derivatives	180
ELAMRANI SLIMANE, RAJI ABDERRHMAN, COMMUTATIVITY OF 3-PRIME NEAR-RINGS INVOLVING HOMODERIVATIONS	181
EL HATTAB LOUBNA, ZARI TARIK, Le Marketing expérientiel et e-commerce : Le rôle des facteurs atmosphériques numériques dans le comportement d'achat des consommateurs	182
EL ALAOUI MOHAMMED, SIDI AMMI MOULAY RCHID, The Navier-Stokes Equations: Mathematics' Greatest Unsolved Challenge	183
HAMANI SOUFIANE, Epidemic Model of Tuberculosis: Analysis of Dynamic Transmission and Simulation	184
ABAAKIL WAFAE, LAABISSI MOHAMED, Exponential stabilization of wave equation with control saturation	185
ELMOUSSAOUY KAOUTAR, MESTARI MOHAMMED, BENHOUAD MOHAMED, Modeling Inflation in the Euro Area: Approach and Perspectives	186
KEITA LANCENI, AZRAR LAHCEN, ATEQ AHMED AL GHAMEDI, Locally meshfree RBF kernel-based method for solving multidimensional hyperbolic equations	187
LAKRIMI HAMZA, AMOUCH MOHAMED, Super-Recurrence of Elementary Operators	188
SADKI HAJAR, Solving the Flow Shop Scheduling Problem by Two Metaheuristics	189
BAROUDI SAMI, KASSIDI ABDERRAZAK, EL MFADEL ALI, ELOMARI M'HAMED, Existence and Uniqueness Results for Higher-Order Nonlinear Fractional Differential Equations via Coincidence Degree Theory	190
BOUSSAIRI ABDERRAHIM, CHERGUI BRAHIM, SARIR ZAINEB, ZOUAGUI MOHAMED, Quasi-orthogonal extension property of symmetric matrices	191
MOULAHARABBI SOMAYYA, BARRAA MOHAMED, Compact operators on right quaternionic Banach spaces	192
KARIM NOUREDDINE, BENCHIHEB OTMANE, AMOUCH MOHAMED, Luh hypercyclic vectors for composition operator	193
LAARICHI YASSINE, RHOLAM OUALID, Fuzzy Mathematics and LSTM for time series forecasting	194
INSAF MAROUANE, AZOUAGH NABIL, KABIL MUSTAPHA, Spatiotemporal Modeling for rainfall data in Morocco using the Quadrantal Autoregressive Model	195
RAIOUADI SALMA, EL ALAOUI TALIBI MOHAMED, HILAL MOUNA, A Fast Algorithm for Optimizing Load-Carrying Capacity in Lubrication Systems including Wall Slip and Cavitation	196
BENHADDA WALID, KASSIDI ABDERRAZAK, EL MFADEL ALI, ELOMARI M'HAMED, Existence criteria for fractional sequential hybrid integro-differential equations with tempered ψ-Caputo operators	197
SENGUN OGUZ MERVE, TUNÇ CEMIL, Hyers-Ulam Type Stabilities of Iterative Integro-Differential Equations of High Order	198
MOUJANE NOUREDDINE, EL OUAARABI MOHAMED, MELLIANI SAID, Choquard-Kirchhoff problems involving variable exponents depending on the solution	199
ENNOURI CHIMAA, ROUBI AHMED, BOUFI KARIMA, Minimizing Fractional Programs by Blocks	200

BOUAOULTAINE OUMAIMA, EL KARCHANI MARYEM, IDRISSI FATMI NADIA, Optimal Control Strategies for Reducing Cardiovascular and Type 2 Diabetes Risks in Psoriasis and Psoriatic Arthritis: A Mathematical Analysis and Numerical Simulation	201
RIKOUANE AHMED, LAGHDIR MOHAMED, Optimality conditions and duality of approximate proper efficiency for bilevel multiobjective fractional programming problems with extremal-value function	202
TAGDAMTE IMAD, Hamiltonien de Davydov-Chaban avec la masse dépendante de la déformation pour le potentiel sextique	203
MEFTAH NAIMA, MOHAMED AMOUCH, Dynamical analysis of tumor-dystrophin interaction model with impact of age of onset and staging	204
BAHOUH OUALID, OUHINOU AZIZ, EZZINBI KHALIL, Qualitative analysis of a SEIR epidemic model in spatially heterogeneous environment	205
HACHOUM SIHAM, A Mathematical Model of Rust Disease Propagation with Delays	206
GOUACH KENZA, EZZAHRAOUI HAMID, On the A-contrations operators	207
ATZEMOURT MOSSAAB, HACHKAR ZAKARIA, CHIHAB YOUNES, Beamforming Optimization techniques for 6G Networks: Approaches and Perspectives	208
ESSEROUKH MOUAD, SETTATI ADEL, HARCHAOUI BILAL, Logistic Growth and Relapse in the Stochastic Dynamics of SIRI Epidemics	209
SOUALHINE KHALID, TALBI MOHAMED, TSOULI NAJIB, ON A CLASS OF GENERALIZED P(X)-BIHARMONIC PROBLEM WITH NO-FLUX BOUNDARY CONDITION	210
DARMOUN SABER, ABDELMOUMEN KHALID, BEN-AZZA HUSSAIN, Height of Reed-Muller Codes: A Computational Study	211
BAIHI ASMAA, LMOU HAMID, HILAL KHALID, KAJOUNI AHMED, The generalized Laplace transform method for a ψ-Caputo coupled system of Volterra integro-differential equations	212
FARHAT KARIM, ELLAHIANI IDRISS, AJEBBAR OMAR, BOUIKHALENE BELAID, Hyers-Ulam Stability Analysis of Some Third-Order Linear Differential Equations with Constant Coefficients	213
SADEK SOUKAINA, ELOMARI M'HAMED, TAQBIBT ABDELLAH, Generalized solution of transport equation in Colombeau algebra using fixed point	214
ABDELALI OUFKIRI, ZARI TAREK, Green Supply Chain Management and Overall Performance of Moroccan Industrial Firms: An Empirical Assessment Using Structural Equation Modeling	215
HAFID MERYEM, ABDELALIM SEDDIK, ELMOUKI ILIAS, KARIM DRISS, On the Optimization of Control Flow Graphs: Algorithmic and Computational Perspectives	216
DOUHOU ABDESSAMAD, MAADEN ABDELHAKIM, An equilibrium vectorial version of Borwein-Preiss's variational principle	217
JOURHMANE HAMZA, KASSIDI ABDERRAZAK, ELOMARI M'HAMED, HILAL KHALID, Topological degree for an anisotropic equation with variable growth	218
KHAIDER HASSAN, EL OUAARABI MOHAMED, RAJI ABDERRAHMANE, The global existence of the stochastic Quasi-geostrophic equations in Fourier-Besov-Morrey spaces	219
ATTMANI JAMAL, ATLAS ABDELGHAFOUR, KARAMI FAHD, A Novel Dynamic Threshold Approach for Image Restoration	220
SOW EL HADJI, Points algébriques de degrés au-plus 5 sur la courbe C d'équation affine y^2=3(x^5-1)	221
MABROUK M'HAMED, LAGHDIR MOHAMED, ED-DAHDAH AHMED, Sequential efficiency optimality conditions for a robust multiobjective fractional optimization problems	222
ZAHRAOUI HANANE, EL HADRI ZOUHAIR, HANAFI MOHAMED, ZIANI MOHAMED, Regularized generalized canonical correlation analysis for multiblock data analysis	223
EZZIDANI AMAL, GHAZALI MOHAMED, EL MOIZE OTHMANE, The M[X]/M/1 queue with single server breakdowns	224

ED-DAHDAH AHMED, LAGHDIR MOHAMED, MABROUK M'HAMED, AMMAR ABDELGHALI, Approximate weak and proper subdifferentials of the difference of two vector convex mappings and applications	225
AHSSOUS FATIMA-ZAHRA, CHAMLAL HASNA, OUALKACHA KARIM, Comparing Penalized and Random Effects Quantile Regression Models for Longitudinal Data	226
SERSIF RACHID, ECHARGHAOUI RACHID, Multiplicity of solutions for fractional (p,q)-Laplacian equations involving the critical exponents and Hardy potential in RN	227
HASSANI HALIMA, Li-Yorke chaotic C0-semigroup	228
HMARRASS HANANE, QESMI REDOUANE, Threshold Dynamics of an Hiv Reactivation Model with Latent Infection, Macrophages, Logistic Growth, and Distributed Delay	229
TOURIA BOUMAAZA, Dynamics of interval maps	230
CHEKIRA CHAIMAE, EL FADILI HAKIM, Applications of discrete moments in image watermarking	231
KOUAKOU VINCENT KOUASSI, On the Rank of a Subfamily of Elliptic Curves Extracted From y^2=x^3-(a+bt)x	232
EZ-ZAHER MOHAMMED-YASSER, SEDDIK ABDELALIM, ED-DYB CHAYMAE, ELMOUKI ILIAS, ON THE RESOLUTION OF THE LATTICE VECTOR PROBLEMS USING Q AND R MATRICES	233
AARAB AMAL, DRIOUCH AICHA, Uncertainty modelling of the nonlinear Black-Scholes equation and decision-making using fuzzy logic	234
BEN LAHBIB ABDELAZIZ, AZRAR LAHCEN, AL-GHAMEDI ATEQ AHMED, Stochastic analysis of temporal tumor evolution with macrophage effects	235
RADAH AMINE, ELHIA MOHAMED, Évaluation du système Ramed dans la ville d'Agadir : Modélisation par équations structurelles	236
BARBARA IDRISS, MASROUR TAWFIK, HADDA MOHAMMED, Adaptive Sampling-Enhanced PINNs for Improved Thermal Modeling in Additive Manufacturing	237
EL KAZOUI KHALIL, Stabilization with decay estimate of distributed parameter second order systems by bilinear control damping	238
AIT BRIK ASMAA, ABDELALIM SEDDIK, ELMOUKI ILIAS, YASSIR TARIK, Anticycling in Linear Problems With Big Data	239
BASSIR IBRAHIM, ACHCHAB BOUJEMÂA, SEAID MOHAMMED, Numerical Solution of Time-Dependent Heat Diffusion Problems Using an Enriched Finite Element Method	240
HABRI HAKIM, FAHID BRAHIM, EL KOUFI AMINE, Dynamics of a Two-Strain Epidemic Model in Complex network with Nonlinear Incidence rate and time delay	241
HOUSSA NOUHAILA, ABDELALIM SEDDIK, ED-DYB CHAYMAE, ELMOUKI ILYAS, Developing A Supervised Learning-Based Web Application For Cancer Tumor Analysis	242
BASSIR MOHAMED EL HASSAN, ACHCHAB BOUJEMÂA, AGOUZAL ABDELLATIF, Analysis of Anisotropic Interpolation Error in Sobolev Spaces with Applications to Mesh Optimization	243
ANKHILI ZAKIA, HIMMI HANANE, OUMOUN MOHAMED, Optimizing over the Weakly Efficient set of a Multi-Objective Optimization Problem	244
AOURAGH MY DRISS, EL ALAMI BOUCHRA, EL BAZ MUSTAPHA, SEGAOUI M'HAMED, SOUFYANE ABDELAZIZ, Stability and Numerical Results for Double Wall Carbon Nanotubes Modeled as Shear Beams	245
AGUEDJIG HAMZA, Mathematical Model of Tumor Spheroid with Real-Time Cell Cycle and Physics-Informed Neural Networks	246
BOUAAM HIND, Variable exponent Kirchhoff-type problems involving singular and non-local terms on Riemannian manifolds	247
CHERKAOUI FATIMA, HILAL KHALID, QAFFOU ABDELAZIZ, Dynamic analysis of fractional order SEQIR epidemic model with nonlinear incidence rate and application to COVID-19 pandemic in Morocco and Italy	248

OUBAHA AICHA, EL OUAARABI MOHAMED, RAJI ABDERRAHMANE, A bi-nonlocal fourth-order elliptic problem	249
JARIR OMAR, EZZAKI HASSAN, EL KAZOUI KHALIL, Output stabilization of infinite dimensional bilinear systems with delayed observation	250
BELKANOUFI RADOINE, TAIK AHMED, BELJADID ABDELAZIZ, Mesh-Free Approaches for Solving the Advection-Dispersion Equation in Unsaturated Flow Systems	251
MORTAJI FARID, LAARABI HASSAN, ABTA ABDELHADI, Global stability analysis, stabilization and synchronization of an SEIR epidemic model	252
CHEFNAJ NAJAT, HILAL KHALID, KAJOUNI AHMED, Analytical investigation of Fractal Fractional Differential Equations with Nonlocal Conditions	253
DOUISSI SOUKAINA, VIENS FREDERI, ERNST PHILIP, Asymptotics of Yule's nonsense correlation for Ornstein-Uhlenbeck paths: The correlated case	254
BENKHALOU HAYAT, Existence and uniqueness of solutions for a p(x)-Schrödinger-type equation under Fourier boundary conditions	255
BALHAG AICHA, A coupled continuous dynamical system for nonconvex optimization	256
RIAHI CHAIMAA, EL FOUTAYENI YOUSSEF, Segmentation of Transition Matrices Using Eigenvalues	257
AZZOUGAGH FATIMA-EZZAHRA, AGMOUR IMANE, EL FOUTAYENI YOUSSEF, Mathematical Modeling of Ecosystem Interactions	258
EL AABBADI ABDELLAH, Numerical Simulation of the Spatial Solow Model	259
MAAROUF NISRINE, Conservation Laws and Symmetry Reductions of the Time-fractional modified Hunter– Saxton Equation	260
BAQQASS SANAE, EL KHAMLICHI SOKAINA, BENSAOUD IMADE, ZOGLAT ABDELHAK, AMAR AMINE, Examining the Impact of Fuel Prices and Inflation on High-Speed Rail Demand in Morocco: A Predictive Modeling Study	261
OUBARKA ISMAIL, BENKHALDOUN FAYSSAL, ELMAHI IMAD, DELEERSNIJDER ERIC, Integrating Numerical Methods and Neural Networks for Solving Shallow Water Equations	262
BOUNKAICHA CHOUAIB, ALLALI KARAM, Stability Analysis of a Reaction-diffusion Fractional-Order SEIR Model with a Saturated Incidence Rate and vaccination	263
ZIOUANE MOHAMED, MOURAD NACHAOUI, LAGHRIB AMINE, NACHAOUI ABDELJALIL, Optimization Algorithms for Real-World Challenges: A Comparative Analysis of CG, BFGS, and L-BFGS	264
EL FAHFOUHI HANAE, EN-NAIMANI ZAKARIAE, HADDOUCH KHALID, Hybrid MLP-XGBoost Model for Bitcoin Price Prediction	265
EL KARKRI IMAD, LAKEHAL ABDELGHNI, EEFQIO: A hybrid meta-heuristic optimization algorithm for global optimization	266
GHANDOR WADII, THE CONTROLLABILITY OF LINEAR FRACTIONAL DELAY DENAMICAL SYSTEMS	267
EL-ALOUY YASSINE, EL BAZ AYAD, Exchange rate pass-through in Morocco: A Markov Switching Analysis	268
ZAHNAOUI IBTISSAM, EL BOUJAOUI HICHAM, Predicting Stock Market Volatility with LSTM Models	269
MALGHI HAYAT, Existence and Ulam-Hyers Stability of mild solutions for a class the hybrid fractional ψ-Caputo	270
EL BEZDAOUI LATIFA, Fractional powers of Hankel transform in Colombeau algebra	271
ERRAMI KHALID, OUHINOU AZIZ, A modeling approach to assess the effect of contact tracing on epidemic dynamics	272
SADEK FATIMA-EZZAHRA, AMOUCH MOHAMED, Common recurrent vectors	273
EL OUADEFLI LAHCEN, EL AKKAD ABDESLAM, ELKHALFI AHMED, Solving the biharmonic problem using isogeometric analysis over multipatch domain	274

ELBOULQE YOUSSEF, EL MAGHRI MOUNIR, An explicit three-term Polak–Ribière–Polyak conjugate gradient method for bicriteria optimization	275
FATIH HAJAR, Étude des déterminants de la perception des TPME marocaines à l'égard du produit bancaire islamique « Salam » : régression logistique	276
MOURAD MAAROUF, Etude de la relation non linéaire entre l'incertitude liée à l'inflation et l'inflation : Cas du Maroc	277
SADOUKI ISMAIL, EL MFADEL ALI, QAFFOU ABDELAZIZ, Approximate Controllability of Fractional Control Systems with Infinite Delays via β−Order Cosine Families in Banach Space	278
ELHAKIMY KHADIJA, EL MFADEL ALI, MELLIANI SAID, Existence of solutions for uncertain nonlocal fractional differential equations via generalized Krasnosel'skii fixed point theorem	279
FANTASSE YASSINE, Hausdorff type operators and wavelet transform associated with the modified	280
SANNAKY IBTISSAM, EL BERRAI IMANE, ADNAOUI KHALID, Transmission of Pathogens among species - A mathematical Approach -	281
AZNAGUE SOULAIMANE, Long-Term Behavior of Stochastic SVIQS Epidemic Models	282
AHMAD ANIS MARDIANA, NANA KHURIZAN NOOR SAIFURINA, Framework for Evaluating University Faculty Efficiency Using Hierarchical Network Data Envelopment Analysis	283
KASIM KARTINI, HAMID HASHIBAH, ABDUL-RAHMAN AYU, A modified location model based on robust approaches for mitigating the impact of outliers	284
ESSEFIANI OUMAIMA, Some Estimation Methods for a Random Coefficient in the Gegenbauer Autoregressive Moving-Average Model	285
BELHDID SALAHEDDINE, On the optimal control of rumor and its impact on the economic environment	286
OUYADRI MOURAD, Proposition of a novel SIRS epidemic model with double epidemics and coexisting epidemics	287
DOUICH YASSINE, SILKAN HASSAN, HANYF YOUSSEF, Eikonal Equation Solved with a Novel Lattice Boltzmann Method Framework	288
JIHAD BENZAID, Identities Involving Symmetric and Skew-Symmetric Elements in a Prime Ring with Involution	289
FIKRI KARIM, ADNAOUI KHALID, MOUAKKIR LAILA, Le comportement mécanique des plaques FG poreuses sur des fondations élastiques	290
MOUCHTABIH SOUFIANE, Mckean-Vlasov BSDEs with locally monotone coefficient	291
OUTAAOUI KHALID, AIT EL HARCH ILHAM, EL FOUTAYENI YOUSSEF, Bioeconomic Modeling of a Complex System of Renewable Common Resources: A Case Study of Moroccan Fisheries	292
OULGHAZI HAMID, A new approach based in deep neural network for solving stochastic optimal control driven by diffusion process with jumps	293
DAOUDI HAMZA, The Autoregressive Distributed Lag (ARDL) cointegration approach for analyzing the relationship between interest rates and per capita income variables	294
MASMODI MOHAMED, Strongly nonlinear parabolic equations with natural growth in general domains	295
ECHARGHAOUI RACHID, KHARMOUDI MOHAMED BELHAJ, KHOUAKHI MOUSSA, MOHAMED MASMODI, A multiplicity result via Ljusternik–Schnirelmann category for a fractional equation involving Hardy-Littlewood-Sobolev critical exponent	296
FAKHRI MARWAN, EL HOUCH ATMANE, BENSLIMANE YASSINE, Exponential stabilisation in Banach spaces for a class of bilinear systems with distributed delay	297
NAIT ALI NACER, BENSAD ALAA EDDINE, IKEMAKHEN AZIZ, Non-negative spherical barycentric coordinates for non-convex geodesic polygons and applications	298
ABOUBKER HASSAN, MORCHID ALAOUI MY DRISS, Multiplicity of solutions for a singular Kirchhoff bi-nonlocal elliptic problem driven by the p(x)-biharmonic operator	299

KHOUAKHI MOUSSA, Existence and multiplicity of positive solutions for a critical fractional Laplacian equation with singular nonlinearity	300
BOUIDI ALAEDDINE, BENHACHMI MOHAMMED KARIM, TALEB ABDESLAM, OPTIMAL DESIGN OF WATER DISTRIBUTION NETWORKS USING LION OPTIMIZATION ALGORITHM	301
IZID MALIKA, CAHADI OUAZZANI AMINA, Geometric Properties of the N-Bishop Frame and Its Spherical Indicatrices	302
EL YAHYAI ABDESLAM, Positive solutions to multi-critical elliptic problems	303
AIT DADA ALLA SAID, EL HAJI BADR, AZRAIBI OUIDAD, Study of Nonlinear Elliptic Equations with Measurable Boundary Conditions in Anisotropic Weighted Sobolev Spaces	304
ELKHETTAB AHLAM, Compartmental Model of Kidney Function Decline Under the Influence of Diabetes and Hypertension	305
ALDAWSARI KHALID, ALMUSAWA MUSAWA, HAMALI WALEED, Unveiling the Mathematical Marvels: Exploring Differential and Integral Equations for Multivariate Hermite-Frobenius-Genocchi Polynomials	306
CHERGUI BRAHIM, About Critical 3-Hypergraphs	307
BOUSSAIRI ABDERRAHIM, EZZAHIR SARA, LAKHLIFI SOUFIANE, MAHZOUM SOUKAINA, Skew-adjacency matrices of tournaments	308
ECHCHAABAOUI EL MAHJOUB, SEQUENTIAL CALCULUS RULE FOR CODERIVATIVE AND APPLICATION	309
EL BOUAZIZI MOHAMMED, ELHAMMA MOHAMED, DAHER RADOUAN, Boas-type theorems for the modified Whittaker transform	310
SOUKTANI IMANE, About the Spectral Theory of Graphs and Two-graphs	311
HAY IHSSANE, Iterative algorithm for a common solution of split equilibrium problems and fixed points problems of a finite family of nonexpansive mapping	312
BEN AMMA BOUCHRA, MELLIANI SAID, CHADLI LALLA SAÂDIA, Hyperbolic Differential Equation with Fuzzy Parameters	313
BOUHOUCH ABDERRAHIM, 5D Black Holes and Black strings from M-Theory in Complete Intersection Calabi-Yau Three-folds (CICY3)	314
HILAL SOUKAINA, Mathematical modeling of improving the understanding of a mathematical concept learned by a teacher of mathématics optimal control	315
LEHRIZI KAWTAR, Image denoising via optimal control of the diffusivity function in the Perona-Malik model	316
KOUMLA SYLVAIN, EZZINBI KHALIL, NELIO NDOGOTAR, Integrodifferential evolution systems with nonlocal initial conditions	317
EL GOURMATI KHADIJA, Double Conformable Fourier Transform	318
LAAZIRI BOUCHRA, Efficient blind image deconvolution using Sobolev space priors and GCV-based parameter estimation	319

ABSTRACTS [COMPUTER SCIENCE]

EL GAJOUI MALIKA, BAKKALI JIHANE, E-learning and technology acceptance: Assessing teachers' acceptance of the E-Takwine online learning platform using the TAM model	320
EL FATMI ABDELHAKIM, BEKRI M. ALI, Enhancing the T-Coffee Method for RNA Sequence Alignment through the Divide and Conquer Principle	321
EL HADDAD KHADIJA, BEKKARI AISSAM, BOUARIFI WALID, JRAIFI ABDELILAH, Medical image analysis using machine learning models	322
AIT HAMMOU NAJIA, MOUSANNIF HAJAR, LAKSSIR BRAHIM, EL AISSAOUI ABDELLAH, Efficient Lane Detection using Mobile U-Net Model	323

HANAN SABBAR, SILKAN HASSAN, ABBAD KHALID, BELLFKIH EL MEHDI, Enhancing Thoracic Disease Classification Using YOLOv8n-cls: A Lightweight Deep Learning Approach	324
HTITI MOHAMED, AKHARRAZ ISMAIL, AHAITOUF ABDELAZIZ, A Novel Image Encryption Scheme Combining Hill Cipher and One-Dimensional Chaotic Map	325
AMEUR MERYEM, CHAJRI YASSINE, DAOUI CHERKI, IDRISSI NAJLAE, Some Stationaries Markov models	326
GANMATI MERIEM, CHAMLAL HASNA, OUADERHMAN TAYEB, Co-clustering methods: An experimental review	327
ABOUDRAR YASMINE, Enhancing Firewall Log Analysis with Deep Learning: A Novel SIEM Architecture for Threat Detection	328
ZMAIMITA HICHAM, MADANI ABDELLAH, ZINE-DINE KHALID, Intrusion Detection System using ML and DL approaches: A Systematic literature review	329
AIT ZAOUIAT CHARAFEDDINE, EDDABBAH MOHAMED, ELGHAZOUANI MOHAMED, AZIZ LAYLA, Optimizing Performance and Security in Invasive Cardiac IoMT with MQTT, CoAP, and Encryption Protocols	330
ZINNANE FATIMA, FERNANE MONSIF, MADANI ABDELLAH, A literature review on OWL-based biomedical ontologies for Clinical Information Management	331
ABDELBAKI MOHAMED, Automated Machine Learning for Healthcare: A Meta-Learning Approach to Algorithm Selection	332
RKHOUYA SAFA, CHOUGDALI KHALID, Enhancing Malware Detection with Deep Learning: A Study on AI-Driven Security Solutions	333
GAZEHI WEJDEN , LOUKIL RANIA , BESBES MONGI, A Comparative Study of Boosting Algorithms for the Classification of Nanoparticle Properties	334
OUDIKA AYOUB, MOUADI HASSAN, KARIM DRISS, The F-limit of a Sequence of Prime Ideals	335
ETTAJER EL HOUCINI, ABOUFADIL YOUSSEF, THALAL ABDELMALEK, Conception numérique des motifs géométriques de Zelliges marocains	336
ELLAKY ZINEB, MATRANE YASSIR, SENNAD MERIEM, BENABBOU FAOUZIA, New Solutions for Evolving VoIP Threats: Enhancing the Security of Asterisk PABX	337
RAFIQ JAMAL EDDINE, ZAKRANI ABDELALI, NOUH SAID, A Hybrid Machine Learning and Generative AI Model for Predicting Academic Performance from Learning Traces	338
ELHADARI ZOUHAIR, ZOUGAGH HICHAM, IDBOUFKER NOUREDDINE, ECH-CHEBABY MOHAMED, A Blockchain-IoT Framework for Transparent Food Supply Chains in Urban Quick-Service Restaurants	339
SLIMAN MOHAMED, BESBES MONGI, BEDIOUI NEILA, Assessing Integration Orders for SARIMA Modeling: Tunisia Gas Demand Forecasting	340
LIICHI SALMA, AZMANI ABDELLAH, KOUNAIDI MOHAMED, BOUKROUH IKHLASS, A Comparative Study of Similarity Metrics for SVM-Based Recurrent Ticket Prediction	341
ABOUFADIL YOUSSEF, ETTAJER EL HOUCINI, THALAL ABDELMALEK, Modélisation informatique des pavages Quasi-périodiques dans l'art des zelliges marocains	342
SAKHI HASNAE, EL FILALI SANAA, Enhancing Dialectal Sentiment Analysis: Contextual Transcoding and Sentence Optimization Using Genetic Algorithms	343
RAFI NAJAT, BOUZKOURA KHADIJA, CHILLALI ABDELHAKIM, Navigating the Future of Cryptography: Opportunities and Challenges in the Age of AI and Quantum Computing	344
MALLOUK OTMANE, JOUDAR NOUR-EDDINE, ETTAOUIL MOHAMED, A Novel Optimization Model for Transfer Learning in Convolutional Neural Networks	345
SOW DEMBA, DIOP MADICKÉ, Performance evolution between ECGenELGAMAL and EdGenELGAMAL	346
ABOURABIA IMADE, OUNACER SOUMAYA, EL GHOUMARI MOHAMMED YASSINE, AZZOUAZI MOHAMED, Prediction of agricultural yields in Morocco using a hybrid algorithm:	347

Segmentation and analysis of irrigation satellite images combined with machine learning and deep learning approaches	
MIARA LAMYAE, BLILAT ASMAE, BENOMAR EL MDEGHRI MOHAMMED, Impact de Chatgpt : Utilisation de L'intelligence Artificielle Et de L'algorithme Génétique Pour Prédire La Performance des étudiants	348
REQUIA ADDOUCH, NOUREDDINE MOUSSAID, OMAR GOUASNOUANE, ANOUAR BEN LOGHFYRY, A Game-Theoretic Variational Model for Image Denoising and Decomposition involving Fractional and Non-local Operators	349
ELHARNAF IBTISSAM, ACHTAICH KHADIJA, TETOUANI SAMIR, SAMMAH SALMA, Enhancing Industrial Maintenance with Machine Learning and Vibration Analysis	350
BAYAR ABDELOUAHAD, Une démarche mathématique pour supporter l'agrandissement optique dans les fontes dynamiques	351
BABACHEKH MOHAMED, Quality of Experience (QoE) Prediction in Morocco's Telecom Sector for Urban and Rural Areas	352
JOSÉ PEREIRA, MENDES LUZIA, CARVALHO DAVIDE, Machine Learning for Diabetes Prediction: a Gradient Boosting Approach with the Pima	353
AMZILE KARIM, Optimising credit risk management with AI: Case study on the application of SVM and ANN to assess the creditworthiness of bank customers	354
DAFALI SIDI MOHAMED, KISSI MOHAMED, EL BEGGAR OMAR, Enhancing Model Accuracy through Explainable Error Analysis: A Decision Tree-Based Approach for XAI	355
DAHBI YASSIR, BEKKARI AISSAM, NEJEOUI ABERRAZZAK, OUJAOURA MUSTAPHA, L'Utilisation de l'IA et du Machine Learning dans les Prévisions de Ventes et l'Optimisation des Performances Commerciales dans le domaine des OPCI	356
OUCHRA HAFSA, BELANGOUR ABDESSAMAD, ERRAISSI ALLAE, Machine learning and remote sensing for urban sprawl detection: A case study of Casablanca	357
OUCHICHA CHAIMAE, Noise-Resilient Segmentation: A Novel Framework for Medical Images	358
MHILISS IMANE, SEBIHI RAJAA, DIDI ABDESSAMAD, Simulation of Interactions of Heavy Charged Particles in Hadron Therapy Using Monte Carlo Geant4 Tools	359
BELLA BRAHIM, CHEMLAL YMAN, AZZOUAZI MOHAMED, DAIF ABDERRAHMANE, A Comprehensive Review of Data Mining Techniques for Analyzing Factors Influencing Graduates' Employability	360
YAMARI SALMA, BENLAHMAR EL HABIB, VAE-Based Anomaly Detection for Load Balancing in Cloud Computing	361
ABBOUR FATIMA ZAHRA, ARDCHIR SOUFIANE, OUNACER SOUMAYA, AZZOUAZI MOHAMED, MAHJOUBI KHADIJA, A Comparative Study of NLP Techniques for Bias Detection in Recruitment Processes	362
OUAHOUDA FATIMAZAHRA, ACHTAICH KHADIJA, Integrating the STEAM Approach in Primary Education: Contributions of Mathematics and Computer Science for Innovative Learning	363
NDAO ABDOURAHMANE, SECK CHEIKH TIDIANE, DIOP BOLY, PRÉDICTION DE LA RÉSURGENCE DE DIX MALADIES INFECTIEUSES SOUS SURVEILLANCE	364
OUBAOUZINE ABDELALI, OUADERHMAN TAYEB, CHAMLAL HASNA, A hybrid approach for feature selection based on graph partitioning and TOPSIS	365
MATRANE YASSIR, ELLAKY ZINEB, BENABBOU FAOUZIA, Analysis of Global Discourse on the Palestinian War: Text Classification through transfer learning	366
HARIRI IMANE, RADID ATIKA, RHOFIR KARIM, Solving Reaction-Diffusion Equations Using Kolmogorov-Arnold Neural Networks: A Comparative Study with Exact Solution	367
SAQALLI MERYEM, Optimisation des systems temps reel dans les véhicules autonomes	368
ETTAFSSAOUI YOUSSEF, BENCHAREF OMAR, Comparative Study of Text Classification Using Deep Learning Models	369

KAMEL HAJAR, CHAMLAL HASNA, OUADERHMAN TAYEB, Adaptive Boundary-Aware Progressive Ensemble for Imbalanced Classification	370
MOUATASSIM KHADIJA, MABROUK ABDELFETTAH, OUCHICHA CHAIMAE, Improving Security in Intelligent Transportation Systems: CNN Model for Multi-Class Intrusion Detection in VANETs	371
CHAFIKI MOHAMED EL AMINE, STITINI OUMAIMA, KALOUN SOULAIMANE, Context-Aware IoT-Driven Smart Resource Allocation Recommendation System for Sustainable Tourism Management	372
MIRAOUI ZAYNEB, NASSER ABDELKADER, KODAD MOHCINE, Urban digital twin towards city digital twin: Framework development	373
RAFIK TAHA, GUERBAZ RABY, Blockchain et marque employeur dans le commerce international: une analyse structurelle de son impact et de ses enjeux	374
BOULBARJ ILIAS, BOUKLOUZE ABDELAZIZ, DOUZI SAMIRA, DOUZI HASSAN (5), Application of Advanced Transformer Neural Networks for Honey Quality Assessment through Thermal Imaging	375
MANSOURI ABDELBASSET, AOURAGH MY DRISS, A Dominant sets Approach to Interactive Image Segmentation	376
MOURAFIK MOHAMED, MOUSSAID LAILA, IA Générative pour une Irrigation Durable : Combler le Manque de Données dans l'Agriculture Marocaine	377
MONIR EL OUARROUDI, JRAIFI ABDELILAH, HARZALLA DRISS, Fine-tuning AraBERT for Arabic Text Extraction and Classification via Chatbot	378
MANSOUHI MERIEM, ELMOUMEN SAMIRA, MOUSSAID NOUREDDINE, Nash game theory combined with convolutional neural network for similar images retrieval	379
LGHAOUCH EL MEHDI, OUNACER SOUMAYA, ARDCHIR SOUFIANE, AZZOUAZI MOHAMED, Hybrid Content-Based Recommendation System Using Machine Learning Models	380
AJMILI KAOUTAR, EL HADAF HOUDA, JRAIFI ABDELILAH, Smart Inventory Management: Q-Learning algorithm for Spare Parts Optimization	381
RAFIQ IMANE, JARIR ZAHI, ASRI HIBA, Data-Centric AI for Enhancing Data Quality in Healthcare: Big Data and IoT Applications	382
SADIQ ABDERRAHMANE, ANTARI JILALI, BOUKHRIS ABDELOUAFI, EL MEJDI ASMA, Olive Yield Prediction in the Mediterranean Region Through Integrating Satellite Imagery, IoT, and Deep Learning: A Comprehensive Review	383
CHABBAKI IKBAL, The Impact of Socio-Cultural Variations on Sentiment Analysis in Dialect	384
FATIH FATIMA, EN-NAIMANI ZAKARIAE, HADDOUCH KHALID, Improvement of Convolutional Neural Networks for Brain Tumor Detection through Bayesian Optimization	385
SAADEDDINE ESSARROUT, Meshless and Monte Carlo Method for Solving the Drug transport equations with random coefficients	386
LAGHRIB ZAKARIA, KISSI BENAISSA, AAYA HASSAN, Damage and Dynamic Behavior of Civil Engineering Structures up to Failure	387
BAALI SARA, HAMIM MOHAMMED, MOUTACHAOUIK HICHAM, HAIN MUSTAPHA, Advances in Feature Selection for Gene Expression Data: A Systematic Review of 2024	388
BENHAFID MERIEM, AKHIATE AZIZ, Risk Management in Supply Chains with the Use of Industry 40 Technologies	389
HADDANE TARIK, BAHASSINE SAID, ZAKRANI ABDELALI, Offensive Text Detection Using Natural Language Processing (NLP)	390
AIT LAHCEN NOUHAILA, LIMAN WISSAL, OUBAHMANE MEHDI, HDOUFANE ISMAIL, ALANAZI MOHAMMED M., HABIBI YOUSSEF, MAATALLAH MOHAMED, CHERQAOUI DRISS, QSAR-Guided Ebola Virus Glycoprotein Inhibitor Design	391
SMILI YOUSSEF, FAKHRI YOUSSEF, EL AMOURY SOFIA, Optimizing CNN Hyper-parameters via Simulated Annealing for Enhanced Brain Tumor Classification	392
BOUSDOG YASSINE, ZAKRANI ABDELALI, NOUH SAID, Generative AI for Software Quality Assessment: A Systematic Review and Analysis of Applications in Code Quality, Technical Debt, and Bug Detection	393

EL ASSAD MOHAMMED, A Comparative Study of Bagging and Boosting Techniques for Correcting Data Transmission Errors	394
LIMAN WISSAL, AIT LAHCEN NOUHAILA, CHERQAOUI DRISS, EL ALLALI ACHRAF, Computational Design of Potent Dimeric Phenylthiazole NS5A Inhibitors for Hepatitis C Virus	395
SAIFI WAFAE, NOUH SAID, BAHASSINE SAID, CHEMSEDDINE IDRISSI IMRANE, A Review of Machine Learning and Deep Learning for Stock Market Crash Prediction	396
LAHJILI IBTISSAM, LMAKRI AZIZ, HIRCHOUA BADR, HAIN MUSTAPHA, Long-Term Electricity Demand Forecasting with Deep Learning Techniques	397
TRICHA ABDELOUAHED, MOUSSAID LAILA, Enhancing Water Sustainability: Transformer Networks for Evapotranspiration Forecasting	398
MOHAMED TFEIL BRAHIM, VIGNEAU EVELYNE, Approche de Classification Hiérarchique Descendante des Variables autour des Composantes Latentes : Applications aux données de pêche maritime Mauritaniennes	399
ZERHOUNI JAOUAD, HOSNI MOHAMED, BAKKAS M'BAREK, Artificial Intelligence in Thermal Energy Storage: A Bibliometric Analysis	400
OUBBAD KAOUTHAR, ELMOUKI ILIAS, JRAIFI ABDELILAH, MADIAFI MOHAMMED, Robotic Control through Liquid Neural Networks and Hindsight Experience Replay	401
MOUHIB ZAKARIA, NOUH SAID, ZAKRANI ABDELALI, L'Impact de l'Intelligence Artificielle Générative sur le Génie Logiciel : Analyse de Modèles Open-Source	402
ELBAYED ZAKARIA, Advanced AI Techniques for Solving Partial Differential Equations: A Case Study on the Black-Scholes Model	403
BIDAH AYMANE, Artificial neural networks based-optimal control of nonlinear epidemic model	404
IDRISSI KHALDI MOUATAZ, ERRAISSI ALLAE, HAIN MUSTAPHA, BANANE MOUAD, Impact of Data Preprocessing on Classification Model Performance	405
LEHLOU FOUAD, EL MAKRANI ADIL, Effectiveness of Transfer Learning-Based Deep Learning Model in Facial Expression Recognition Compared to a Sequential Model	406
WALJI KAMAL, Balancing Performance and Efficiency in Sentiment Analysis: Traditional and Neural Approaches	407
ARRACH MOURAD, EL BARAKA NOURREDINE, SADIQ ABDERRAHMANE, Integration of Artificial Intelligence in Wastewater Treatment Processes: A Comprehensive Analysis of Emerging Trends	408
MALIH AYMANE, BENCHAREF OMAR, A Multi-Agent System for AI-Powered Contract Validation Under Moroccan Law	409
EL JIANI LAILA, EL FILALI SANAA, BENLAHMAR EL HABIB, ALAOUI FATIMA ZAHRA, BANOU ZOUHEIR, Enhancing Breast Cancer Diagnosis using Blood Vessel Segmentation in Breast MRI	410
CHEDDOUR ZAKARIAE, L'intelligence artificiel dans le contexte de la Cyber-sécurité	411
ISKNAN JAMAL, ELOUAHAM SAMIR, AIT ICHOU ILYAS, Advanced Phonocardiogram (PCG) Signal Processing Using VMD	412
CHERKAOUI ASMAA, Enhancing Blockchain PoW with Fisher-Yates Shuffle and a Merkle-Damgård-Inspired Hash Function	413
FATIMA-ZAHRA ALAOUI, EL JIANI LAILA, EL FILALI SANAA, AIT ABDELOUAHID RACHIDA, BANOU ZOUHEIR, Agriculture 50: Plant Disease Detection Using Deep learning (Comparison between CNN and VGG16)	414
LKOAIZA ABDELKARIM, Adopting the Grendel Approach in Blockchain Signature Mechanisms as a Counterpart to Keccak Permutation	415
SAHIB MOHAMED RIDA, Stock Trends Forecasting with FinBERT and Bi-LSTM	416
RIDA ABDERRAHIM, A Practical Approach of DevSecOps Integration in Multi-Tier Web Applications	417
ELKINANI ILYAS, HOSNI MOHAMED, MEDARHRI IBTISSAM, MASROUR TAWFIK, Ensemble Classification Methods for Stock Market Movement: A Review	418

BENMANSOUR OUSSAMA, MEDARHRI IBTISSAM, HOSNI MOHAMED, Predictive Maintenance in Industrial Systems Using Machine Learning: A Review	419
SOUKRI AZIZ, EL BANNAY OMAR, GHOFIR KARIM, Dynamique des Bibliothèques Python Pour Les Matrices issues des Problèmes Inverses Mal Posés	420

ICRAMCS 2025
THE SEVENTH EDITION OF THE INTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE
April 24-25-26, 2025 | Marrakech, Morocco

Comparison of Bayesian and Frequentist Approaches in Nominal Item Response Theory Modelling

Communication Info

Author:
Olayiwola Matthew ADETUTU

Federal University of Technology, Minna, Nigeria

Keywords:
(1) Bayesian
(2) Frequentist
(3) Nominal

Abstract

The research utilized a non-linear regression model to quantify unobserved characteristics of candidates in examinations and their outcomes [1]. Performances of Bayesian over Frequentist approaches in estimating nominal item response theory model parameters $\mathrm{P}(y_{ij}=k|a_i,b_i,\theta_j)\frac{\exp\{a_{ik}(\theta_j-b_{ik})\}}{=\sum_{h=1}^{4}\exp\{a_{ih}(\theta_j-b_{ih})\}}$, $\theta_j\sim N(0,1)$ [2]. Priors $a_{ik}\sim dnorm(m.a,pr.a)I(0,0)$, $b_{ik}\sim dnorm(m.b,pr.b)$, $m.a\sim dnorm(0,0.1)$, $m.b\sim dnorm(0,0.1)$ $pr.a\sim digamma(10,1)$ and $pr.b\sim digamma(10,1)$ were used to determine the posterior densities and Brooks-Gelman-Rubin Convergence Diagnostic Statistic suggested 10000 updates to have valid estimates of the intended parameters in accordance to [4]. Findings revealed that Bayesian technique gave positives, and interpretable item discriminating parameters with relatively low standard errors, and more confined credible intervals for the parameters' estimates in line with the principle of item response theory modelling [5].

© ICRAMCS 2025 Proceedings ISSN: 2605-7700

References

[1] Adetutu, O. M. On Unobserved Traits and Its Measurements: A Note on Modern Item Response Modelling Approach, Proceedings of International Conferences on Mathematical Modelling Optimization and Analysis of Diseases Dynamics (ICMMOADD) 1 (1), 2024, 493-500 https://mathmodel.com.ng/ojs-3405/index.php/icmmoadd

[2] Bock, R. D. Estimating Item Parameters and Latent Ability When the Response are scored in Two or More Nominal Categories. Psychometrika, 37(1972), 29-51.

[3] Hassan, M. U., & Miller, F. Discrimination with Unidimensional and Multidimensional Item Response Theory Models for Educational Data. *Communications in Statistics - Simulation and Computation* **49**(12), (2019), 3299-3313, https://doi.org/10.1080/03610918.2019.1705344

[4] Adetutu, O. M., & Lawal, H. B. Applications of Item Response Theory Models to Assess Item Properties and Students' Abilities in Dichotomous Responses Items. *Open Journal of Educational Development (ISSN: 2734-2050), 3*(1), (2023) 01-19. https://doi.org/10.52417/ojed.v3i/.304

[5] Lim, S. Review: A Course in Item Response Theory and Modeling with Stata, and Using R for Item Response Theory Model Applications. *Structural Equation Modeling: A Multidisciplinary Journal*. **27**(4), (2020) 657-659, https://doi.org/10.1080/10705511.2020.1740886