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# IFSCOM 2026

# ABSTRACT BOOK

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# PREFACE

Dear Conference Participants,

It is our pleasure to present the Abstract Book of the 11th International IFS and Contemporary Mathematics Conference (IFSCOM 2026), held on 09–12 September 2026 in Mersin, Türkiye, in a hybrid format.

Since its first meeting in 2014, IFSCOM has provided an international platform for researchers to share recent scientific developments, exchange ideas, and establish academic collaborations. IFSCOM 2026 brought together researchers from various areas of pure and applied mathematics, including intuitionistic fuzzy sets and related theories, algebra, analysis, topology, geometry, statistics, optimization, mathematical modeling, data science, and mathematical aspects of artificial intelligence.

This Abstract Book presents the contributions delivered at IFSCOM 2026 and reflects the diversity of the scientific research represented at the conference. We hope that these studies will encourage further research, discussion, and collaboration within the international scientific community.

We sincerely thank the keynote and invited speakers, authors, participants, Scientific Committee, reviewers, and Organizing Committee for their valuable contributions to the success of IFSCOM 2026.

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# SEMI-ANALYTICAL WAVE STRUCTURES IN THE SOLITON NEURON MODEL

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## ABSTRACT

This study applies the Improved Bernoulli Sub-Equation Function Method to the Soliton Neuron Model to obtain semi-analytical solution expressions. First, a traveling-wave transformation is introduced to reduce the governing equation to an ordinary differential equation. The resulting equation is then treated using the proposed method, leading to solution expressions associated with different wave profiles. Finally, the behavior of the obtained solutions is illustrated through two- and three-dimensional plots generated using Wolfram Mathematica.

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# DETERMINATION OF THE RATES OF APPROXIMATION OF FUNCTIONS IN THE HÖLDER CLASS UNDER HARMONIC MODULATION

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## ABSTRACT

Approximation theory is a fundamental branch of mathematical analysis that aims to express complex functions through simpler structures while providing strict control over error terms. In a recent study, Nicolay D. Kuz'michev (2025) established the existence of approximation for functions in Hölder spaces and their derivatives using Fourier coefficients under harmonic modulation [1]. While Kuz'michev's work demonstrated the qualitative convergence of this modulated framework, the precise rate at which this approximation occurs remained an open question. In this paper, we determine the rate of approximation for functions $f(y) \in C^{\alpha}(G)$ with $\alpha \in (0,1)$ on the inner domain $G = [a+h, b-h]$ and their derivatives using Fourier coefficients obtained under the harmonically modulated transformation $y = x + h\cos t$.

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# GENERALIZED STATISTICAL LIMIT OF BOREL MEASURABLE FUNCTIONS

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## ABSTRACT

A generalization of the statistical limit for Borel-measurable functions is investigated within a density framework of order $\alpha$, constructed by means of modulus functions and a measure. The relationship between this generalized limit and the classical limit is examined, and its fundamental properties and related results are established. Moreover, statistical limits at infinity for Borel-measurable functions are considered. In particular, it is shown that the statistical limit at infinity is equivalent to the classical limit at infinity. In addition, a measure-based generalized statistical limit for functions at a finite point is investigated, and its basic properties are established.

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# APPROXIMATION BY PERTURBED BERNSTEIN-SCHURER-STANCU TYPE OPERATORS IN COMPACT DISKS

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ABSTRACT
In the present paper, we introduce a new class of complex generalized Bernstein-Schurer-Stancu operators in compact disks. For this class of operators, we first establish quantitative upper bounds of the convergence. We then derive lower bounds based on a qualitative Voronovskaja-type result, and by combining these lower bounds with the previously established upper bounds, determine the exact order of simultaneous approximation.

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# DESCRIPTION OF A DETERMINISTIC MATHEMATICAL MODEL IN ENVIRONMENTAL HEALTH ANALYSIS

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## ABSTRACT

**Background:** In addition to deteriorating biological habitats, the complex and variable nature of ecosystems creates significant uncertainties regarding the current state of toxic inputs in environmental matrices and their subsequent impacts on health. Therefore, mathematical toxicological models developed using experimental parameters offer crucial approaches to resolve these uncertainties, manage variability, and enhance the interpretability of experimental outcomes. Furthermore, multidisciplinary ecotoxicological modeling has recently provided substantial advantages in monitoring environmental safety. Specifically, employing computationally applied methods to predict interactions between environmental toxins and living organisms through susceptibility analyses in both in vivo and in vitro frameworks has yielded increasing economic and predictive benefits.
**Methodology:** To this end, this study investigates and compares toxic material dynamics in two different fish species sampled from distinct biological domains, utilizing a deterministic mathematical model based on tissue concentrations.
**Results:** The results demonstrate that computational models can be uniquely tailored depending on the organism type, the specific metal, and temporal variables, thereby shaping the core design of the study.
**Conclusion:** Finally, a sample case study is discussed to illustrate the selection of appropriate mathematical frameworks for specific ecotoxicological setups. Highlighting diverse computational models can provide more reliable, supportive, and robust foundations for future research in multidisciplinary ecotoxicological studies.

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# PREDICTING NON-LINEAR BREAKING POINTS IN AQUATIC POPULATIONS: ASSESSING MODEL UNCERTAINTY AND ECOLOGICAL THRESHOLDS VIA MONTE CARLO SIMULATIONS

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ABSTRACT

**Background:** Environmental contamination by heavy metals poses a critical threat to aquatic ecosystems, demanding precise ecological risk assessments. Traditional deterministic frameworks, such as the classical logistic growth model, offer foundational insights into density-dependent population dynamics. However, they inherently rely on fixed, static parameters that fail to capture the stochastic fluctuations of natural habitats and variable toxicological stresses.
**Methodology:** To bridge this gap, this study transitions from a deterministic baseline to a probabilistic forecasting framework using identical empirical datasets. We developed a stochastic model integrated with Monte Carlo simulations executed in the R programming language. The deterministic parameters - specifically the intrinsic growth rate (r) and environmental carrying capacity (K)-were transformed into Gaussian (Normal) probability distributions. A total of 10,000 independent stochastic iterations were performed across three distinct boundary conditions based on initial population densities: low adaptive growth ($P_0 < \mathrm{K}$), critical equilibrium ($P_0 = \mathrm{K}$), and high-density population decline ($P_0 > \mathrm{K}$).
**Results:** While the deterministic approach identified single-line, rigid breaking points in population trajectories, the Monte Carlo simulations mapped comprehensive uncertainty bounds. This probabilistic approach successfully quantified the cumulative probability of sudden population collapse over time, revealing that model predictability is highly sensitive to the initial boundary constraints under heavy metal exposure.
**Conclusion:** These findings demonstrate that incorporating stochastic modeling into ecotoxicological data provides a significantly more robust, risk-adjusted forecasting tool. Ultimately, this framework enhances the reliability of environmental

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health risk assessments and supports more proactive ecological management strategies.

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# NEW INEQUALITIES INVOLVING CAPUTO-FABRIZIO INTEGRAL OPERATORS FOR (S,M)-CONVEXITY

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## ABSTRACT

In this study, we focus on Caputo-Fabrizio operators due to their extensive applications across various fields. Initially, we establish a novel characterization of this operator, which serves as the foundation for our subsequent analysis. Leveraging this newly derived identity, we develop a series of integral inequalities within the framework of (s,m)-convex functions. Furthermore, we explore the implications of these inequalities in the broader context of integral analysis, demonstrating how our results generalize and refine numerous existing findings. Our research not only extends prior contributions but also provides valuable insights and methodological advancements for addressing complex mathematical and scientific challenges.

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# A NOTE ON GENERATORS OF CYCLIC INVARIANTS OF METABELIAN LEIBNIZ ALGEBRAS

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## ABSTRACT

In this talk, we provide generators of the algebra of invariants of the cyclic group in the free metabelian Leibniz algebra of low rank.

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# A RANDOM MATHEMATICAL MODELING OF POPULATION DYNAMICS OF TÜRKIYE UNDER THE INFLUENCE OF SOCIOECONOMIC FACTORS AND POLICY INTERVENTIONS

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## ABSTRACT

Modeling population dynamics provides valuable forecasting capabilities, particularly for countries facing significant shifts in their population structure. Türkiye has been experiencing population aging and a decrease in population growth lately. In this study, a system of ordinary differential equations has been used to model the effects of socioeconomic and behavioral factors along with policy interventions on the population dynamics of the country. Parameters calibrated to represent the dynamics for Turkish population have been used to model the changes in population between 2010-2024. The resulting model is analyzed numerically to provide an estimation of the scenario for the upcoming period. The effects of economical and migration-related factors on the population are additionally assumed to be random variables to model the statistical properties of population dynamics caused by an uncertainty in several components. Results show that population aging and declining fertility rates will continue in the future. Findings are presented with graphical presentations and statistical characteristics to provide a comprehensive outline of the scenario for Türkiye.

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# ELASTIC ANALYSIS OF VARIABLE CROSS-SECTION FUNCTIONALLY GRADED POLAR ORTHOTROPIC ROTATING DISCS

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## ABSTRACT

This study addresses a variable cross-section disk made of functionally graded orthotropic material. The elastic analysis of the disk, which is fixed at one end and free at the other, and rotated with a constant angular velocity, is performed using the pseudospectral Chbeyshev method. The material properties are assumed to be continuously radially functionally graded (FG) according to the Voigt mixture rule. The effects of rotation on the elastic behavior of the disk for different cross-sections are investigated. The elastic responses of the functionally graded material in the disk are discussed.

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# A NOTE ON THE PRESENTATION OF SYMMETRIC GENERATORS IN METABELIAN LIE ALGEBRAS

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## ABSTRACT

In this talk, we provide all defining relations for the algebra of symmetric polynomials, via its generators, in the free metabelian Lie algebra of finite rank.

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# ON CERTAIN SUBSEMIGROUPS OF THE CATALAN MONOID

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## ABSTRACT

Let $\mathcal{C}_n$ be the Catalan monoid. For any idempotent $\xi \in \mathcal{C}_n$, we consider the set $\mathcal{C}_n(\xi) = \{\alpha \in \mathcal{C}_n : \alpha^m = \xi \text{ for some } m \in \mathbb{Z}^+\}$, for which we prove that $\mathcal{C}_n(\xi)$ is the maximum nilpotent subsemigroup of $\mathcal{C}_n$ with zero element $\xi$. Furthermore, we give a necessary and sufficient condition for $\mathcal{C}_n(\xi)$ to be completely isolated. For $1 \leq i \leq n$, we also consider the submonoid $\mathcal{C}_{n,i} = \{\alpha \in \mathcal{C}_n : i \in \operatorname{fix}(\alpha)\}$ of $\mathcal{C}_n$. We show that $\mathcal{C}_{n,i}$ is a (completely) isolated and convex submonoid of $\mathcal{C}_n$. Finally, we determine the cardinality of $\mathcal{C}_{n,i}$ and present two approaches for computing its rank.

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# SOME ALGEBRAIC PROPERTIES OF ERNST CARTAN AND ERNST-LUCAS CARTAN NUMBERS

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## ABSTRACT

In this paper, we define two new forms of Cartan numbers called Ernst and Ernst-Lucas Cartan numbers. By using four consecutive Ernst numbers and Ernst-Lucas numbers as the components of units of a Cartan number, we introduce Ernst and Ernst-Lucas Cartan numbers, respectively. After that, we give some algebraic properties of these special Cartan numbers.

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# ON THE DEGREE-RATIO SOMBOR INDEX OF THORNY GRAPHS

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## ABSTRACT

In chemical graph theory, vertex-degree-based topological indices play a pivotal role in predicting the physicochemical properties of molecular compounds. This study comprehensively investigates the Degree-Ratio Sombor (DRSO) index of thorny graphs, which are constructed by attaching a specific number of pendant vertices (thorns) to the vertices of a parent graph[6]. Thorny graph structures, originally introduced and extensively studied by Gutman, are widely utilized to model branched molecular structures. The DRSO index of a graph $G$ is defined as $\mathrm{DRSO}(G) = \sum_{uv \in E(G)} \sqrt{\frac{d_u^2 + d_v^2}{d_u d_v}}$ [1], where $d_u$ and $d_v$ denote the degrees of the end-vertices $u$ and $v$ of edge $uv$. We present exact analytical formulas and establish rigorous upper and lower bounds for the DRSO index of general thorny graphs, relying solely on the degrees of the parent vertices and the number of attached thorns. Furthermore, closed-form expressions are derived for several fundamental thorny graph classes, including cycles, complete graphs, paths, stars, and the specific thorny path structure $P^*_{n,m}$.

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# ON INTUITIONISTIC FUZZY UNIFORM SUBMODULES, GOLDIE DIMENSION AND SPANNING DIMENSION

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## ABSTRACT

The notions of uniform modules, Goldie dimension and spanning dimension play a central role in module theory. Recently, intuitionistic fuzzy versions of several module theoretic concepts such as essential submodules, superfluous submodules, hollow submodules and supplement submodules have been developed. Motivated by these developments, we introduce the notions of intuitionistic fuzzy uniform submodules, intuitionistic fuzzy Goldie dimension and intuitionistic fuzzy spanning dimension. Fundamental properties are established and several characterizations are obtained. In particular, it is shown that the intuitionistic fuzzy Goldie dimension and intuitionistic fuzzy spanning dimension of an intuitionistic fuzzy submodule are completely determined by their supports. Relationships between intuitionistic fuzzy uniformity, intuitionistic fuzzy hollowity, intuitionistic fuzzy Goldie dimension and intuitionistic fuzzy spanning dimension are also investigated.

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# APPLICATION OF HPSTM TO A 2+1 DIMENSIONAL KOLMOGOROV–BACKWARD EQUATION

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## ABSTRACT

In this study, the Homotopy Perturbation Sumudu Transform Method (HPSTM) is applied to a 2+1 dimensional Kolmogorov–Backward initial value problem. The proposed approach combines the Sumudu transform with the Homotopy Perturbation Method to construct the solution. The initial condition is directly incorporated into the solution procedure, and successive solution components are generated through the homotopy perturbation process. The resulting series is expressed in closed form, yielding the analytical solution of the problem. The obtained solution is further illustrated through two- and three-dimensional graphical representations.

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# GLOBAL WELL-POSEDNESS AND BLOW-UP OF SOLUTIONS FOR A NONLINEAR WAVE EQUATION WITH SINGULAR DAMPING

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## ABSTRACT

In this paper, we investigate the global well-posedness and blow-up behavior of solutions to a nonlinear wave equation with singular damping. Under suitable assumptions on the initial data and the nonlinearity, sufficient conditions for global existence and finite-time blow-up are established.

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# HARGREAVES-SAMANI MODEL AND THE IMPLICATIONS OF ESTIMATED EVAPOTRANSPIRATION ON TEA CULTIVATION IN EASTERN BLACK SEA REGION

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## ABSTRACT

In this paper the spatial and temporal characteristics of reference evapotranspiration ($ET_0$) in eastern Black Sea region of Türkiye were investigated using the Hargreaves-Samani model. Official meteorological records obtained for Rize, Trabzon and Artvin in the region for the period 1927-2025 were utilized to estimate monthly and annual $ET_0$ values. The calculated reference evapotranspiration values were analyzed to identify differences among locations and to evaluate regional variations. The estimated $ET_0$ patterns were then examined in relation to tea cultivation in eastern Black Sea region. This empirical temperature-based methodology provides a mathematical modeling approach for planning and management of cultivation across the region.

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# LINGUISTIC BASIC PROBABILITY ASSIGNMENT FOR EVIDENTIAL FUSION

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ABSTRACT

Linguistic information is common in decision-making and evaluation settings where uncertainty, vagueness, and subjective interpretation are inherent. Converting such information into numerical values may lead to a loss of meaning and may not fully reflect the uncertainty contained in linguistic assessments. Dempster-Shafer evidence theory provides a mathematical framework for representing incomplete and uncertain information through basic probability assignments, belief functions, and plausibility functions.
This study addresses the use of linguistic basic probability assignment in evidential fusion. Linguistic assessments are represented within an evidential structure in which belief masses reflect the uncertainty associated with verbal information. Belief and plausibility functions define the range of evidential support, while Dempster's rule of combination provides a mechanism for integrating multiple and potentially conflicting pieces of evidence. The framework provides a general basis for evidential reasoning problems involving qualitative, vague, and linguistically expressed information.

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# MATHEMATICAL MODEL FOR SLUTSKY REFORMULATION

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ABSTRACT
The goal of this paper is to reformulate the theory of demand for goods that reflects varying degrees of production-consumption possibilities. The emerging theory provides clues to the rationality of some outcomes observed under non-market institutions in developing countries. We show that the neoclassical model of individual demand is violated under imperfect or incomplete markets. Under the new conditions, we present a new Slutsky model capturing the dynamics of household sensibility with respect to price that differentiates demand responses from different households. Our results show sensible alignment with the old Slutsky method, with improvement. This new method can now be generally accepted and recommended for economists to adopt since it satisfies all the requirements of the Slutsky.

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# COMPUTATION OF GENERALIZED INVERSES OF TENSORS OVER COMMUTATIVE RINGS

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## ABSTRACT

Generalized inverses of tensors play increasingly important roles in computational mathematics and numerical analysis. It is appropriate to develop the theory of generalized inverses of tensors within the algebraic structure of a ring. The main purpose of this paper is to study different generalized inverses of tensors over a commutative ring. Several results are provided in support of the theoretical results.

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# ON THE INTERPOLATIVE BOYD-WONG TYPE FUZZY CONTRACTIONS

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## ABSTRACT

This study aims to define a new type of contraction called an interpolative Boyd-Wong type fuzzy contraction, and additionally formulates a theorem proving the existence of fixed-point for this new contraction. The contraction produced in this study is based on an interpolative contraction defined by E. Karapınar (2020) in metric spaces and also utilizes a method used particularly by M. Sangurlu Sezen (2025).

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# $g_n$ HELICES IN MINKOWSKI 3-SPACE

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## ABSTRACT

Since Lancret's classical theorem, the characterization of special curves — general helices, slant helices, Bertrand curves, Mannheim curves, and rectifying curves — has been a central theme in curve theory, with natural extensions to Minkowski space motivated by the role of Lorentzian geometry in relativity. While these curves have been studied extensively in the Lorentzian setting, a systematic parametrization of the Frenet frame by *Euler angles* has remained largely unexplored.

In this work we construct the Frenet frame of both spacelike (Type I) and timelike curves in $\mathbb{R}^3_1$ as a composite Lorentzian rotation $A_f = R_z(\psi)R_x(\phi)R_y(\theta)$, elliptic or hyperbolic according to the causal character of each axis. Differentiating this frame yields closed-form expressions for $\kappa(s), \tau(s)$ in terms of $\theta, \phi, \psi$ and their derivatives, together with a compatibility condition equivalent to arc-length parametrization.

Using these formulas, we give necessary and sufficient Euler-angle conditions for a curve to be a general helix, a slant helix (explicit slant parameter $\sigma$), a Bertrand curve (with an explicit sufficiency proof), a Mannheim curve (spacelike case, where the Lorentzian rectifying plane flips $\kappa^2 + \tau^2$ to $\kappa^2 - \tau^2$), and a rectifying curve. We further introduce a hierarchy of $g_n$-helices, built recursively from the spherical indicatrix of the principal normal, with the associated slant-type parameter invariant across all levels. All results are illustrated with worked examples verified by symbolic computation.

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# A GENERALIZATION OF DEFERRED CESÀRO SUMMABILITY TO FRACTIONAL ORDERS

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## ABSTRACT

In this paper, we introduce a generalization of the deferred Cesàro summability method to fractional orders. We demonstrate the comprehensiveness and versatility of this newly defined operator by establishing its connections to various well-established summability methods. Specifically, we show that under appropriate choices of the boundary sequences and the fractional order parameter, the proposed method elegantly reduces to several fundamental summability methods.

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# $A$-STATISTICAL CAUCHY SEQUENCES WITH A RATE VIA IDEALS

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## ABSTRACT

In this presentation, we introduce the notion of $A^{\mathcal{I}}$-statistical Cauchy sequences with the rate of $o(a_n)$, where $A = (a_{nk})$ is a nonnegative regular summability matrix, $a = (a_n)$ is a positive nonincreasing sequence, and $\mathcal{I}$ is an admissible ideal of $\mathbb{N}$. Using the previously established notions of $A^{\mathcal{I}}$-statistical limit superior and limit inferior with the rate of $o(a_n)$ (see [4]), we prove that the coincidence of these two extremal limits yields $A^{\mathcal{I}}$-statistical convergence with the rate of $o(a_n)$. As the main result, we show that a real sequence is $A^{\mathcal{I}}$-statistically convergent with the rate of $o(a_n)$ if and only if it is $A^{\mathcal{I}}$-statistically Cauchy with the rate of $o(a_n)$.

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# A NOTE ON THE NOWICKI CONJECTURE FOR LEIBNIZ ALGEBRAS

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## ABSTRACT

In this talk, we review the Nowicki conjecture with known results, and investigate the case when the polynomial algebra of even rank is replaced by the free metabelian Leibniz algebra of low rank.

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# NEW HERMITE-HADAMARD-MERCER-TYPE GENERALIZED FRACTIONAL INTEGRAL INEQUALITIES FOR INTERVAL-VALUED CONVEX FUNCTIONS

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ABSTRACT
In this paper, we investigate new integral inequalities for interval-valued convex functions within the framework of fractional integral operators. Interval analysis, as introduced in foundational works [6], provides a rigorous structure for handling uncertainty, which has been extensively applied to interval-valued functions [10]. By combining the convexity properties of interval-valued mappings with Jensen-Mercer-type inclusions [2, 7], we establish several new Hermite-Hadamard-Mercer-type fractional integral inequalities.

Suitable parameterizations and weighted integration techniques are employed to derive fractional integral bounds involving the Gamma function and generalized left- and right-sided fractional integral operators. In particular, building upon fractional Hermite-Hadamard-type inclusions for interval-valued and coordinated convex functions [1, 3, 9], a series of inclusion relations is obtained. These relations connect midpoint-type evaluations, fractional integral expressions, endpoint values, and convex combinations of interval-valued mappings.

These results extend the classical Hermite-Hadamard and Jensen-Mercer inequalities—complementing recent developments in interval-valued fractional inclusions for various generalized convexity classes [4, 5, 8]—and provide a unified framework in which several related inequalities can be recovered through appropriate choices of the parameters. The findings contribute to the theory of interval-valued fractional inequalities and may provide a basis for further developments involving generalized convexity and fractional integral operators.In this paper, we investigate new integral inequalities for interval-valued convex functions within the framework of fractional integral operators. Interval analysis, as introduced in foundational works [6], provides a rigorous structure for handling uncertainty, which has been extensively applied to interval-valued functions [10]. By combining the convexity properties of interval-valued mappings with Jensen-Mercer-type inclusions [2, 7], we

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establish several new Hermite-Hadamard-Mercer-type fractional integral inequalities.

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# ON THE BEHAVIOR OF SOLUTIONS FOR A FIFTH-ORDER SHALLOW WATER WAVE EQUATION

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## ABSTRACT

In this paper, we consider the Cauchy problem for a fifth-order shallow water wave equation, which generalizes the classical Camassa-Holm equation by incorporating high-order dispersion and a linear damping term. By employing Kato's theorem for abstract quasi-linear evolution equations, we establish the local well-posedness of the solutions in Sobolev spaces. Then we investigate the global existence result.

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# CYCLIC LOCALLY RECOVERABLE CODES OF LENGTH $u(q+1)$ WITH LOW LOCALITY

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## ABSTRACT

A linear code has locality $r$ when every coordinate of a codeword can be rebuilt from at most $r$ of the remaining coordinates; codes with this property are known as locally recoverable codes (LRCs). Since a single node failure can then be repaired by contacting only a handful of surviving nodes, LRCs keep the repair bandwidth and the repair latency of large-scale storage platforms such as Microsoft Azure and Hadoop low. In this work we produce $q$-ary cyclic LRCs of length $u(q+1)$, where $q$ is a prime power and $u \geq 2$ is an integer dividing $q-1$. The defining set of each code is assembled from two blocks with separate duties: one block is the full group of $(q+1)$-st roots of unity, which forces the locality down to $u-1$, and the other consists of consecutive powers of a primitive $n$-th root of unity, which drives the minimum distance through the BCH bound. Small values of $u$ therefore yield codes of very small locality, and $u = 2$ attains the least possible value $r = 1$. We illustrate the construction with codes whose minimum distances were determined by computer, among them a Singleton-type optimal $[24, 10, 6]_{11}$ code of locality 1.

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# POSITIVE PSEUDO-ALMOST PERIODIC SOLUTIONS AND ULAM–HYERS STABILITY FOR A FRACTIONAL NICHOLSON-TYPE MODEL WITH MIXED DELAYS

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ABSTRACT
We study a scalar fractional Nicholson-type equation on the real line containing multiple discrete delays and an infinite distributed delay. The linear part is represented by the positive Mittag–Leffler kernel associated with a Weyl–Liouville derivative of order $0 < \alpha < 1$. The coefficients are allowed to be pseudo-almost periodic, and a strictly positive pseudo-almost periodic external input is included. First, we prove that convolution with an integrable positive Mittag–Leffler kernel preserves pseudo-almost periodicity. We then establish an appropriate composition result for Nicholson nonlinearities. By constructing a closed invariant order interval and applying the Banach contraction principle, we obtain existence and uniqueness of a strictly positive pseudo-almost periodic mild solution. Explicit lower and upper estimates for the solution are derived. We also prove continuous dependence on the coefficients and Ulam–Hyers stability of the mild equation. A concrete example with a non-almost-periodic ergodic perturbation illustrates the hypotheses. The results provide a direct framework for population models subject simultaneously to recurrent environmental effects, transient mean-zero perturbations, maturation delays, and hereditary recruitment.

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# HILBERT'S 14-TH PROBLEM IN NONASSOCIATIVE SETTINGS

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## ABSTRACT

Let $P_n$ be the polynomial algebra of rank $n$. The general linear group $\mathrm{GL}_n$ acts on $P_n$ canonically. Finite generation of the algebra $P_n^G$ consisting of $G$-invariants is the main motivation of Hilbert's 14-th problem, where $G \leq \mathrm{GL}_n$. This problem has been solved for the algebra $P_n$ that is associative, yet remained for free algebras $F_n$ in varieties of nonassociative algebras. In this talk, we survey the recent results on $F_n^G$ for some certain algebras $F_n$ and groups $G$.

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# ROUGHNESS BEHAVIOR OF FRACTAL INTERPOLATION FUNCTIONS VIA FOURIER SERIES WITH ALTERNATING SCALING FACTORS

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ABSTRACT
Fractal Interpolation Functions (FIFs) provide a powerful mathematical framework for modeling irregular shapes where classical Euclidean geometry remains inadequate [1]. In this study, Fractal Interpolation Functions are represented via Fourier series using both constant and variable vertical scaling factors. This approach enables the optimal approximation of irregular signals with complex and rough structures through periodic waveforms. It is well known in the existing literature that variable scaling factors yield graphs with smoother profiles and lower roughness compared to constant scaling factors [2]. In this work, the scaling factors are structured according to the general terms of alternating series; Fourier approximations are derived for both constant and variable cases, and the effect of this method on the fractal dimension and graphical roughness of the generated structure is investigated. The obtained theoretical results are simulated and illustrated in the MATLAB environment. The findings reveal that applying the alternating structure to variable scaling factors in Fractal Interpolation Functions triggers vertical directional fluctuations and high-frequency harmonics in the Fourier series, thereby increasing the local roughness degree and the amplitude of oscillations of the function.

**Keywords:** Fractal Interpolation Function, Constant and Variable Scaling Factors, Alternating Series, Roughness.

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# FRAMED SURFACE PENCILS WITH A GIVEN FRAMED ASYMPTOTIC

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## ABSTRACT

In this study, a surface pencil passing through a given framed curve is constructed in parametric form, and the conditions to obtain a framed surface are determined. The criteria for the framed curve to be an asymptotic on the framed surface are also defined. This asymptotic property is shown to be invariant under rotations and reflections. To illustrate the findings, two examples of a framed surface containing the given framed asymptotic are presented.

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# OSCILLATION CRITERIA FOR SECOND-ORDER HAHN DIFFERENCE EQUATIONS

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## ABSTRACT

We study the oscillatory behavior of solutions of second-order Hahn difference equations on non-uniform grids. Using the unified structure of the Hahn operator, which includes the Jackson $q$-difference and the classical forward difference operators as special cases, we establish Leighton–Wintner type oscillation criteria for linear self-adjoint equations. These results are further applied to canonical and non-canonical nonlinear equations to obtain sufficient conditions for oscillation. The obtained criteria describe the role of the parameters $q$ and $\omega$ in the oscillatory behavior of solutions and provide extensions of classical continuous and discrete oscillation results. Several examples are given to illustrate the applicability of the criteria.

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# UNIVERSITY PROGRAMME EVALUATION USING A HYBRID CRITIC–FUZZY TOPSIS MODEL

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## ABSTRACT

University choice depends on several factors, and some of the indicators used to compare programmes vary from one admission period to another. This study evaluates twenty undergraduate mathematics programmes at Turkish state universities using CRITIC and fuzzy TOPSIS. Five criteria are considered: admission success ranking, intake per faculty member (quota divided by teaching staff), provincial population, the URAP institutional score, and the senior faculty ratio. Admission and staffing data were taken from three consecutive editions of the official programme-level tables published by the Turkish Assessment, Selection and Placement Centre (ÖSYM); population data were obtained from the Turkish Statistical Institute (TÜIK), and institutional scores from the University Ranking by Academic Performance (URAP). The admission and staffing figures were cross-checked against the relevant published records. For each criterion, the three most recent observations were represented by a triangular fuzzy number based on their minimum, median, and maximum. CRITIC assigned the largest weight to intake per faculty member, which showed relatively weak correlations with the remaining criteria. The ranking stage then used these data-derived weights together with the three-year fuzzy representations.

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# INEQUALITIES OBTAINED WITH $s$-EXPONENTIAL CONVEX FUNCTIONS IN THE THIRD SENSE INVOLVING CAPUTO FRACTIONAL DERIVATIVES AND CAPUTO-FABRIZIO INTEGRALS

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## ABSTRACT

We derive midpoint-type integral inequalities and the Hermite-Hadamard inequality for $s$-exponential convex functions in the third sense. Moreover, we present the classic results obtained as special cases of the Hermite-Hadamard inequality for $s$-exponential convex functions in the third sense. We also obtain results involving Caputo derivatives and Caputo-Fabrizio integrals for $s$-exponential convex functions. Additionally, we establish important theorems for n-times differentiable functions under this convexity for Caputo derivatives. Finally, we obtain theorems for first-order differentiable functions and second-order differentiable functions for $s$-exponential convex functions.

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# A NEW GENERALIZATION OF BERNSTEIN-SCHURER-KING-TYPE OPERATORS

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## ABSTRACT

In the present paper, we propose a new family of Bernstein-Schurer-King-type operators characterized by the preservation of the first and third test functions in Korovkin's theorem. We first investigate the rate of convergence through moduli of smoothness of the first and second order. In addition, we derive Voronovskaja- and Grüss-Voronovskaja-type asymptotic results for the proposed operators.

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# A NEW PARAMETRIC FUZZY ENTROPY FAMILY $E_k(A)$

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ABSTRACT

In this paper, we propose a new parameterized fuzzy entropy measure, $E_k(A)$, for quantifying uncertainty in fuzzy sets. The theoretical properties of the proposed entropy are investigated. The proposed entropy is then integrated into an entropy-based fuzzy TOPSIS framework to determine objective criterion weights and rank alternatives. The proposed entropy is applied to a real-world sustainable circular supplier selection problem in the textile industry. Its results are then compared with those of several well-established fuzzy entropy measures using the same fuzzy TOPSIS framework. The comparative results show that the proposed entropy produces ranking results consistent with most of the considered entropy measures, supporting its use as an alternative fuzzy entropy measure for multi-criteria decision-making.

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# REPRESENTATİON OF INTUİTİONİSTİC FUZZY GROUP ALGEBRA

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ABSTRACT

This talk presents a representation theory for intuitionistic fuzzy group algebras (IF-GAs), extending fundamental concepts and results of classical group representation theory to the intuitionistic fuzzy setting. We introduce IFGA-representations and investigate their basic algebraic properties, with particular emphasis on invariant subspaces and decompo-sition. Using the notion of G-invariant subspaces, we establish direct-sum decomposition results analogous to those in classical representation theory. The concepts of kernels and faithful representations are further generalized to the IFGA framework, and their essential properties are examined. A Maschke-type theorem for IFGA-representations is then estab-lished, yielding necessary and sufficient conditions for complete reducibility. These results demonstrate that several fundamental principles of classical representation theory possess natural and meaningful counterparts in intuitionistic fuzzy group algebras, thereby provid-ing a foundation for further development of representation theory in intuitionistic fuzzy algebraic structures.

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# KNOT MOSAIC CIPHER: TOPOLOGICAL FOUNDATIONS OF A SYMMETRIC ENCRYPTION SCHEME

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ABSTRACT
We study a local information-encoding framework within the eleven-tile knot mosaic system of Lomonaco and Kauffman [1]. While traditional mosaic studies focus on grid enumeration [2] or space-efficient knot tabulations [3], we examine validity-preserving data embedding. Four tiles share the identical endpoint signature (1,1,1,1); cells occupied by these tiles are designated as carrier cells and strictly confined to the interior ($c \leq (n - 2)2$). Because carrier substitutions preserve edge compatibility, mosaic validity is maintained without requiring knot isotopy invariance [4]. Each carrier cell stores 2 raw bits. In an aligned 256-symbol message protocol, 4 carrier tiles (8 bits) are dedicated to the termination delimiter (END), yielding an effective payload capacity of $L_{max} = \lfloor (c - 4)/4 \rfloor$ data symbols ($2c - 8$ net bits). For example, empirical $11 \times 11$ mosaics ($c \approx 23$) and $20 \times 20$ mosaics ($c \approx 94$) store 4 symbols (32 bits) and 22 symbols (176 bits), respectively, guaranteeing exact, deterministic symbol recovery.

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# MATHEMATICAL MODELING OF TUBERCULOSIS TRANSMISSION WITH REINFECTION AND DRUG RESISTANCE

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ABSTRACT

Tuberculosis (TB) remains one of the world's leading infectious diseases, with Nigeria ranking among the highest-burden countries globally, particularly in regions where there is high population density, limited healthcare access, and treatment failure due to poor quality drug and incomplete treatment which lead to continues transmission. Existing research predominantly concentrates on susceptible tuberculosis (TB), without considering the rising challenge posed by drug-resistant TB, which undermines control efforts. A comprehensive TB model has been developed that incorporate both reinfection and drug-resistant compartments. This model categorizes the population into seven compartments. The analysis established the disease-free equilibrium (DFE) and endemic equilibrium (EE) points, with the basic reproduction number ($R_0$) calculated using the Next Generation Matrix (NGM) method. Our findings indicate that TB eradication is possible also stability analysis of the DFE showed that TB can be eradicated when $R_0<1$, while an endemic state remains when $R_0>1$. Sensitivity analyses pinpointed critical factors influencing $R_0$, specifically the rates of progression, treatment, and natural mortality. Numerical visualizations indicate that treating infectious TB alone is insufficient to eliminate the disease due to reinfection and treatment failure, which can lead to the emergence of drug-resistant TB. This highlights the need for integrated strategies addressing both reinfection and drug resistance through effective treatment, rapid diagnostics, and active case detection. The model serves as a framework for understanding TB transmission particularly in high-densely environments and provides insights for public health policies and TB control programs.

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# MULTI-OBJECTIVE METAHEURISTIC OPTIMIZATION OF MOBILEFACENET: A COMPARATIVE ANALYSIS OF SIMULATED ANNEALING AND GENETIC ALGORITHM

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ABSTRACT
Meeting the requirements of high accuracy, low memory consumption, and fast inference in deep learning models used in resource-constrained devices necessitates systematic adjustment of architecture and training parameters. In this study, the architecture, ArcFace, and training hyperparameters of the MobileFaceNet architecture are optimized through multi-objective searches using Simulated Annealing (SA) and Genetic Algorithm (GA); the resulting configurations are compared with a manually adjusted reference model under the same data splitting, training budget, and evaluation conditions. The six-dimensional search space includes embedding dimension, channel multiplier, ArcFace margin, scale, learning rate, and weight reduction. Candidate solutions are evaluated over 30% of the CIFAR-10 training data for fifteen epochs, and selected configurations are trained over 90% of the data for thirty epochs. The reference model produces 91.50% accuracy, 520,000 parameters, a model size of 2.04 MB, and a processor latency of 10.00 ms. SA increases accuracy by 1.32 percentage points to 92.82%, while reducing the number of parameters by 7.29% to 482,112, the model size to 1.89 MB, and the latency to 9.94 ms. GA, on the other hand, increases accuracy by 1.07 percentage points to 92.57%; it produces a more compact structure with 494,922 parameters and a model size of 1.94 MB, while recording a latency of 10.08 ms. These findings show that SA surpassed the reference model in all four criteria examined; while GA provides higher accuracy and lower memory requirements in exchange for a negligible increase in latency. Statistical analyses performed on independent repetitions confirme that the accuracy gains are significant and that the observed performance trend is stable and repeatable. Consequently, both metaheuristic methods provide reliable alternatives to manual tuning, with SA delivering the strongest overall accuracy-efficiency balance.

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# AN EFFICIENT LAPLACE ADOMIAN DECOMPOSITION APPROACH FOR A CAPUTO FRACTIONAL-ORDER STOMACH MODEL

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## ABSTRACT

This study presents an efficient numerical approach for solving a fractional-order stomach mathematical model using the Laplace Adomian Decomposition Method (LADM). The three-compartment Tension-Food-Medicine (TFM) model captures the complex interactions between psychological stress, nutritional intake, and pharmaceutical intervention. The fractional derivative is considered in the Caputo sense, allowing for the incorporation of memory effects in the physiological system. The accuracy of LADM is validated through comparison with the fourth- and fifth-order Runge–Kutta method (ODE45) for the integer-order case. Numerical simulations demonstrate the influence of fractional order on the dynamics of tension, food, and medicine compartments across three distinct parameter scenarios. The results reveal that decreasing fractional order values lead to slower relaxation dynamics, reflecting the hereditary properties of fractional derivatives in modeling gastrointestinal processes.

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# AN EFFICIENT APPROACH TO A FRACTIONAL EBOLA VIRUS MODEL

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## ABSTRACT

This study examines a nonlinear Fractional Ebola virus model to characterize the spread of infectious diseases through a modified version of the Caputo fractional derivative. The Laplace Adomian Decomposition Method (LADM) is used to find approximate analytical solutions for the proposed model, given as rapidly converging series that show quick convergence and accurately describe how the system works. The method's reliability has been confirmed, and the proposed fractional-order model's validity has been verified. The novelty of this study lies in applying the Laplace Adomian Decomposition Method for the Fractional Ebola virus model and in benchmarking the resulting series against a fourth- and fifth-order Runge–Kutta method (ODE45) solution for the integer-order case, before extending the analysis to $\alpha = 0.9$ and $\alpha = 0.75$ to quantify how memory effects reshape the epidemic curve.

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# IMPACT OF ANİSOTROPY AND NON-UNİFORM CONDUCTİVİTY ON VENTRİCULAR ACTİVATİON ISOCHRONES USİNG DTI-BASED CARDİAC

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ABSTRACT
This study investigates the impact of tissue anisotropy and conductivity non-uniformity on cardiac excitation propagation using a Monodomain reaction-diffusion model coupled with the Aliev-Panfilove formulation. Heart models were constructed from Diffusion Tensor Imaging (DTI) data, with two conduction system approaches compared: a manual model based on trabecular locations and an automated DTI-derived model. Results demonstrate that the DTI-based conduction model produces activation isochrones closely matching experimental measurements from Durrer et al. When cardiac tissue was modeled as isotropic, significant deviations in activation timing were observed compared to anisotropic simulations. A novel method incorporating non-uniform conductivity distribution using DTI-derived Diffusion Volume parameters was proposed, yielding more physiologically realistic activation patterns where the left ventricle activates earlier than the right ventricle. These findings establish that both anisotropy and non-uniform conductivity are essential for accurate cardiac excitation modeling, and that DTI data provides valuable information beyond geometric reconstruction for determining tissue electrical properties, with important implications for personalized cardiac electrophysiology modeling.

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# OPTIMIZATION OF HISTOGRAMS FOR LOGNORMAL PARAMETER ESTIMATION IN HYDROLOGICAL TIME SERIES: A COMPARATIVE STUDY OF THE FIERZË BASIN

RUDIN HOXHA
*0000-0000-0000-0000*

ABSTRACT
Accurate estimation of probability distribution parameters is a fundamental challenge in hydrological time series analysis. This study builds upon recent non-parametric findings regarding the Drin Cascade by comparing three distinct binning methodologies—Scott's Rule, the Freedman-Diaconis Rule, and Knuth's Bayesian method—to estimate the parameters of a log-normal distribution for the lateral inflows of the Fierzë hydropower basin (N = 12, 570). Robustness analysis via Politis-Romano subsampling reveals that standard empirical rules, which rely on absolute data ranges, are mathematically fragile when subjected to extreme tail outliers. Conversely, Knuth's Bayesian approach demonstrates superior structural stability. Comparative evaluations confirm that parameters derived from Bayesian optimal bins mathematically outperform those from empirical rules in baseline statistical Goodness-of-Fit evaluations (Log-Likelihood). By exploring the mathematical foundations of these discretization techniques, this paper demonstrates how histogram optimization directly impacts the accuracy of parametric regression, providing a more mathematically rigorous framework for baseline hydrological probability modeling.

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# MATHEMATICAL MODELING OF THE BEHAVIOR OF CHLORINATED ANILINES ON RESIN-BOUND COBALT IONS IN AQUEOUS SOLUTION

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ABSTRACT
In this study, mathematical surface models describing the ligand-exchange adsorption behavior of 2-chloroaniline, 3-chloroaniline, 4-chloroaniline, and 2,5-dichloroaniline isomers on Co(II)-CDAE-sporopollenin resin were developed using breakthrough curve data reported by Uçan [6]. Here, for each isomer, the resin capacity was expressed as a sigmoid surface function dependent on two independent variables: saturation time and ligand concentration. The unknown coefficients of this function were determined using the MATLAB software package and toolbox, employing the Robust LAR algorithm and the Levenberg-Marquardt method. The models obtained from these studies exhibited a high statistical fit with the experimental data, with coefficients of determination of 0.9997, 0.9998, 0.9987, and 0.999, respectively. These results demonstrate that the proposed sigmoid surface function provides a reliable and useful tool for estimating resin capacity at unmeasured breakthrough times and concentration values, and that the same functional structure can also be applied to structurally similar chlorinated aniline derivatives.

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# NEW TWO-PARAMETER FUZZY ENTROPY

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ABSTRACT

In this study, a new measure of two-parameter fuzzy entropy $E_{\alpha,\lambda}(A)$ for classical fuzzy sets is proposed. The proposed measure is designed to satisfy the fundamental axiomatic conditions of fuzzy entropy and thanks to its alternative mathematical structure, aims to quantify uncertainty in a more effective and consistent manner. The theoretical properties of the proposed formulation is examined in detail. Analytically, the value of an entropy is 1 for an element with a membership degree of $\frac{1}{2}$. It is known that the entropy is monotonically increasing for elements with a membership degree less than $\frac{1}{2}$ and monotonically decreasing for elements with a membership degree greater than $\frac{1}{2}$. From this perspective, the axiomatic validity of the newly defined two-parameter entropy is analytically proven. In addition, it is investigated under what conditions the new two-parameter entropy yields the previously defined entropies.

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# 9 SEPTEMBER 2026

**REGISTRATION (Face to Face)**
09:00-10:00

**OPENNING CEREMONY (Face to Face/Online)**
**Prof. Dr. Erol Yaşar**
**Assoc. Prof. Dr. Gökhan Çuvalcıoğlu**
10:30-10:45

**KEYNOTE SPEAKER**
Hilbert's 14-th Problem in Nonassociative Settings
**Prof. Dr. Şehmus FINDIK** (Face to Face)
**Chair:** Gökhan Çuvalcıoğlu
11:00-11:45

**LUNCH BREAK**
12:00-13:30

| | HALL-A (Face to Face) |
|---|---|
| | Chair: |
| 13:30-13:45 | Semi-Analytical Wave Structures in The Soliton Neuron Model<br>Ugur Bayrakcı, Seyma Tuluce Demıray, **Ahmet Hakan Doğan** |
| 13:45-14:00 | Application of Hpstm To A 2+1 Dimensional Kolmogorov--Backward Equation<br>Seyma Tuluce Demıray, **Guzide Yıldız** |
| 14:00-14:15 | Generalized Statistical Limit of Borel Measurable Functions<br>**Alifa Othman Aljamili**, Mehmet Küçükaslan |

**COFFEE BREAK**
14:30-14:45

# 9 SEPTEMBER 2026

## POSTER PRESENTATIONS

Poster Session Area (Face to Face)

**14:45-15:15**

Roughness Behaviors of Fractal Interpolation Functions via Alternating Series
**Sema Metin**, Uğur Değer

Description of A Deterministic Mathematical Model in Environmental Health Analysis
**Burcu Yeşilbudak**

Predicting Non-Linear Breaking Points in Aquatic Populations: Assessing Model Uncertainty and Ecological Thresholds via Monte Carlo Simulations
**Burcu YEŞİLBUDAK**

| | HALL-A (Face to Face) |
|---|---|
| | Chair: |
| 15:15-15:30 | A New Parametric Fuzzy Entropy Family $E_K(A)$<br>**Sinem Tarsuslu (Yılmaz)**, Gökhan Çuvalcıoğlu, Arif Bal |
| 15:30-15:45 | New Two-Parameter Fuzzy Entropy<br>**Arif Bal**, Gökhan Çuvalcıoğlu, Sinem Tarsuslu (Yılmaz) |
| 15:45-16:00 | A note on Generators of Cyclic Invariants of Metabelian Leibniz Algebras<br>**Damla Şazenuş Akkoç** |
| 16:00-16:15 | Elastic analysis of variable cross-section functionally graded polar orthotropic rotating discs<br>Özlem Öcal, Mehmet Ali Sabihaoğlu, **Durmuş Yarımpabuç** |
| 16:15-16:30 | New Inequalities Involving Caputo-Fabrizio Integral Operators for (S,M)-Convexity<br>**Canan Ödemiş**, Abdullah Akkurt, Hüseyin Yıldırım |

# 10 SEPTEMBER 2026

## KEYNOTE SPEAKER

**Higher Type Fuzzy Systems for Control and Robotic Applications**
**Prof. Dr. Oscar Castillo** (Online)

**Chair:** Gökhan Çuvalcıoğlu
09:00-09:45 (Local Time Zone: 9 September, 23:00-23:45)

## COFFEE BREAK

09:45-10:00

**INVITED SPEAKER**

The Evolution of Hermite–Hadamard Inequalities: Classical Results, Fractional Extensions, and New Weighted Perspectives

**Prof. Dr. Hüseyin Budak**(Online)

**Chair:** Gökhan Çuvalcıoğlu

10:00-10:45

**COFFEE BREAK**

10:45-11:00

| | HALL-A (Online)- | | HALL-B (Online)- |
|---|---|---|---|
| | Chair: | | Chair: |
| 11:00-11:15 | Computation of Generalized Inverses of Tensors Over Commutative Rings<br>**Mehsin Jabel Atteya** | 11:00-11:15 | Determination of The Rates of Approximation of Functions in The Holder Class Under Harmonic Modulation<br>**Ahmet Köprücü,** Uğur Değer |
| 11:15-11:30 | On The Degree-Ratio Sombor Index of Thorny Graphs<br>Enes Dökme, **Yaşar Nacaroğlu** | 11:15-11:30 | A-Statisiıcal Cauchy Sequences With A Rate via Ideals<br>**Mustafa Gülfırat** |
| 11:30-11:45 | A note on The Presentation of Symmetric Generators in Metabelian Lie aAlgebras<br>**Ela Aydın** | 11:30-11:45 | A Generalization of Deferred Cesàro Summability to Fractional Orders<br>**Muhammet Ali Okur**, Yılmaz Erdem |
| 11:45-12:00 | A Note On The Nowicki Conjecture For Leibniz Algebras<br>**Nazar Şahin Öğüşlü** | 11:45-12:00 | Inequalities Obtained with S-Exponential Convex Functions in The Third Sense Involving Caputo Fractional Derivatives and Caputo-Fabrizio Integrals<br>**Sümeyye Ermeydan Çiriş,** Hüseyin Yıldırım |
| 12:00-12:15 | Cyclic Locally Recoverable Codes of Length U(Q+1) With Low Locality<br>**Rabia Zengin**, Mehmet Emin Köroğlu | 12:00-12:15 | Approximation by Perturbed Bernstein-Schurer-Stancu Type Operators In Compact Disks<br>**Yeter Beyza Erdoğan**, Nursel Çetin |

**LUNCH**

12:15-13:00

**INVITED SPEAKER**

Representation of Intuitionistic Fuzzy Group Algebra

**Prof. Dr. P. K. SHARMA** (Online)

**Chair:** Gökhan Çuvalcıoğlu

13:00-13:45 (Local Time Zone: 15:30-16:15 )

**COFFEE BREAK**

13:45-14:00

| | HALL-A (Online)- | | HALL-B (Online)- |
|---|---|---|---|
| | Chair: | | Chair: |
| 14:00-14:15 | A Random Mathematical Modeling of Population Dynamics of Türkiye under the Influence of Socioeconomic Factors and Policy Interventions<br>Damla Yaşar**, Zafer Bekiryazici** | 14:00-14:15 | Multi-Objective Metaheuristic Optimization of Mobilefacenet: A Comparative Analysis of Simulated Annealing Aad Genetic Algorithm<br>Mustafa Kemal Aydın**, Şükran Konca** |
| 14:15-14:30 | Hargreaves-Samani Model and the Implications of Estimated Evapotranspiration on Tea Cultivation in Eastern Black Sea Region<br>İslam Epöz, Hakan Gökmen**, Zafer Bekiryazici** | 14:15-14:30 | Knot Mosaic Cipher: A Topological Approach to Symmetric Encryption<br>**Umut Esen,** Mehmet Çitil |
| 14:30-14:45 | Global Well-Posedness and Blow-Up of Solutions for a Nonlinear Wave Equation with Singular Damping<br>**Hatice Taskesen** | 14:30-14:45 | An Efficient Laplace Adomian Decomposition Approach for a Caputo Fractional-Order Stomach Model<br>**Hatıra Günerhan** |
| 14:45-15:00 | Positive Pseudo-Almost Periodic Solutions and Ulam–Hyers Stability for A Fractional Nicholson-Type Model with Mixed Delays<br>**Ramazan Yazgan** | 14:45-15:00 | On the Interpolative Boyd-Wong Type Fuzzy Contractions<br>**Meryem Bozdemir** |
| 15:00-15:15 | Mathematical Model for Household Behaviour: Price Theory in Production-Consumption Economies in Nigeria<br>Olumide Olusola Taiwo, Muhammad Sirajo Abdullahi, Halima Usman, Abdulkarim Bello, Abdulkarim Isa Umar, **Jafar Anafi** | 15:00-15:15 | A New Generalization of Bernstein-Schurer-King-Type Operators<br>**Tamay Gültekin**, Nursel Çetin |
| 15:15-15:30 | Oscillation Criteria for Second-Order Hahn Difference Equations<br>**Sibel Doğru Akgöl**, Ağacık Zafer | 15:15-15:30 | An Efficient Approach to a Fractional Ebola Virus Model<br>**Hatıra Günerhan**, Hadi Rezazadeh |
| 15:30-15:45 | New Hermite-Hadamard-Mercer-Type Generalized Fractional Integral Inequalities for Interval-Valued Convex Functions<br>**Nisa Başkan,** Abdullah Akkurt, Hüseyin Yıldırım | | |

**POSTER PRESENTATIONS**

HALL-C (Online)

**14:00-14:45** (Local Time Zone: 13:00-13:45 )

Optimization of Histograms for Lognormal Parameter Estimation in Hydrological Time Series: A Comparative Study of the Fierzë Basin

**Rudin Hoxha**

**COFFEE BREAK**

| 15:30-15:45 | | | |
|---|---|---|---|
| | HALL-A (Online)- | | HALL-B (Online)- |
| | Chair: | | Chair: |
| 15:45-16:00 | Short Remark on a New Intuitionistic Fuzzy Implication<br>**Krassimir Atanassov** | 15:45-16:00 | Mathematical Modeling of the Behavior of Chlorinated Anilines on Resin-Bound Cobalt Ions in Aqueous Solution<br>**Ufuk Arıkan**, Yavuz Sürme, Durmuş Dağhan |
| 16:00-16:15 | On Intuitionistic Fuzzy Uniform Submodules, Goldie Dimension and Spanning Dimension<br>Poonam Kumar Sharma**, Gagandeep Kaur** | 16:00-16:15 | On Certain Subsemigroups of the Catalan Monoid<br>**Emrah Korkmaz** |
| 16:15-16:30 | Impact of Anisotropy and Non-Uniform Conductivity on Ventricular Activation Isochrones Using DTI-Based Cardiac Modeling<br>**Ihab Elaff** | 16:15-16:30 | Framed Surface Pencils with a Given Framed Asymptotic<br>**Sevilay Çoruh Şenocak**, Ergin Bayram |
| 16:30-16:45 | University Programme Evaluation Using a Hybrid CRITIC--Fuzzy TOPSIS Model<br>**Sude Büşra Kazel**, Elif Şahin, Rıdvan Şahin | 16:30-16:45 | Mathematical Modelling of Tuberculosis Transmission with Reinfeciıon and Drug Resistance<br>**Abdulrazak Ahmed**, Olumide Olusola Taiwo, Jafar Anafi, Ahmad Rufai Tasiu |
| 16:45-17:00 | Linguistic Basic Probability Assignment for Evidential Fusion<br>**Olcay Mert Kopuz**, Elif Başkan, Rıdvan Şahin | 16:45-17:00 | On The Behavior of Solutions for A Fifth-Order Shallow Water Wave Equation<br>**Nurhan Dündar** |
| 17:00-17:15 | Some Algebraic Properties of Ernst Cartan and Ernst-Lucas Cartan Numbers<br>**İlayda Çetin**, Emre Sevgi | 17:00-17:15 | $g_n$-helice in Minkowski 3-space<br>**Mesut Altınok** |

**CLOSING CEREMONY (Face to Face/Online)**

17:30