9TH INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES

17 – 19 May 2025,
Diyarbakır – Türkiye

PROGRAM BOOK

ONLINE

9th International Conference on Computational Mathematics and Engineering Sciences
17 – 19 May 2025, Diyarbakır – Türkiye

THE NINETH INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES (CMES-2025), DiYARBAKIR/TÜRKİYE, MAY 17-19, 2025

The **Nineth International Conference on Computational Mathematics and Engineering Sciences (CMES-2025)** will be held in Dicle University from **17- to 19 May 2025 in Dicle, Türkiye.** It provides an ideal academic platform for researchers and professionals to discuss recent developments in both theoretical, applied mathematics and engineering sciences. This event also aims to initiate interactions among researchers in the field of computational mathematics and their applications in science and engineering, to present recent developments in these areas, and to share the computational experiences of our invited speakers and participants.

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MESSAGE FROM THE GENERAL CHAIRS

Dear Conference Attendees,

We are honored to welcome you to the **Nineth International Conference on Computational Mathematics and Engineering Sciences (CMES-2025)** at Dicle University from 17 to 19 May 2025 in Diyarbakır City, Türkiye.

CMES, founded in 2016 at Faculty of Science and Techniques Errachidia Moulay Ismail University Morocco is an annual intarnational conference, which was very successful in the past years by providing opportunities to the participants in sharing their knowledge and informations and promoting excellent networking among different international universities. This year, the conference includes 200 extended abstracts, several submissions were received in response to the call for papers, selected by the Program Committee. The program features keynote talks by distinguished speakers such as:

Dumitru Baleanu from Lebanese American University, Beirut, Lebanon; **Baver Okutmustur** from Middle East Technical University, Türkiye; **Mehrdad Lakestani** from Tabriz University, Iran, **Ekrem Savas** from Usak University, Türkiye; **Ozlem Defterli** from Çankaya University, Türkiye; **Sedaghat Shahmorad** from Tabriz University, Iran. The conference also comprises contributed sessions, posters sessions and various research highlights.

We would like to thank the Program Committee members and external reviewers for volunteering their time to review and discuss submitted abstracts. We would like to extend special thanks to the Honorary, Scientific and Organizing Committees for their efforts in making CMES-2025 a successful event. We would like to thank all the authors for presenting their research studies during our conference. We hope that you will find CMES-2025 interesting and intellectually stimulating, and that you will enjoy meeting and interacting with researchers around the world.

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Hasan Bulut,

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Zakia Hammouch,

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China Medical University Hospital Taichung 40402, Taiwan.

TOPICS

Control Theory,

Game Theory,

Applied Mathematics,

Financial Mathematics,

Artificial Intelligence,

Education Sciences,

Engineering Sciences,

Computer Science,

Information Technology,

Geometry and Its Applications,

Analysis and Its Applications,

Statistics and Its Applications,

Algebra and Its Applications,

Topology and Its Application,

Chaos and Dynamical Systems,

Cryptography and its Applications,

Fractional Calculus and Applications,

Economics and Econometric Studies,

Electrical and Electronic Engineering,

Defense industry and applications,

Mathematical Biology,

Computational Epidemiology,

Mathematical Chemistry,

Mathematics Education and Its Applications,

Numerical Methods and Scientific Programming,

Linearand Nonlinear programming and Dynamics,

Modeling of Bio-systems for Optimization and Control,

Ordinary, Partial, Stochastic and Delay Differential Equations,

Computational Fluids mechanics. Heat and Mass Transfers,

Earth Sciences,

Applied Sciences

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Full version of submitted papers will be published in Special Volumes of reputed journals. Procedure, Guidelines and Checklist for the preparation and submission of papers to the Proceedings of CMES-2025 can be found in the journals websites. The journals in which selected and peer-reviewed full papers of CMES-2025 will be published are as follows:

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3. FRACTAL AND FRACTIONAL JOURNAL [SCI-E],
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PLENARY & INVITED TALKS

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MODIFIED FRACTIONAL OPERATORS: THEORY AND APPLICATIONS

Dumitru Baleanu [1]

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Abstract

Fractional Calculus deals with the study of so-called fractional order integral and derivative operators over real or complex domains, and their applications. In this talk I will discuss the modified ABC operator and I will explain the related properties and its real world applications.

Keywords: Fractional calculus;General kernel; Modified ABC operator.

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A COMPARATIVE STUDY OF ADAPTIVE GRID METHODS FOR BURGERS MODELS

Baver Okutmustur[1]

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Abstract

This work presents comparative numerical study of shock solutions in classical and relativistic a Burgers models using two finite volume-based adaptive mesh refinement (AMR) strategies: h-adaptivity (local grid refinement) and r-adaptivity (mesh redistribution). The h-method dynamically adjusts resolution by adding/removing cells in shock regions, while the r-method maintains a fixed cell count but optimally redistributes points to sharpen shock resolution. We compare both approaches in terms of accuracy and efficiency, demonstrating their effectiveness for handling shocks and nonlinear waves in both classical and relativistic cases. This work is based on the joint work [4].

Keywords: Adaptive grid; h-refinement; r-refinement; Monitor function; Finite volume method; Relativistic Burgers equation

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THE DEVELOPMENT ADVENTURE OF MATHEMATICS

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Abstract:

Mathematics has always existed since the first steps of culturel history of the living creatures called human beings. It has always been a part of culture with numbers, figures, characteristics and with their applications according to the technical levels of the day. In this study, a general knowledge will be given concerning how math began and what phases it went through up to now. In getting the data, books and articles dealing with the issue have been studied. The findings we have show that it is not possible to say exactly where and when mathematics began. However, we can say, on the basis of findings, that math began in Epypt and Mesopotamia between 3000-2000 B.C. and then spread to other countries.

ADVANCED MATHEMATICAL MODELLING AND INFERENCE OF GENE REGULATORY NETWORKS WITH REAL DATA

Ozlem Defterli[1]

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Abstract

Systems biology addresses the challenge of understanding living systems in their entirety, as opposed to concentrating on individual biological elements.One approach to describing biological systems is through networks which are the graphical representations in which nodes denote entities of the system and edges signify the relationships between them.Given that the underlying structure of many networks remains partially or entirely unknown, a key objective of systems biology is to predict the complex and dynamic interactions among genes.This is called *network inference (NI) that* focuses on deducing network structures by leveraging high-throughput data in combination with reverse engineering methods. A fundamental challenge in network inference is the high dimensionality—often involving thousands of genes—contrasted with the relatively small number of available samples. Consequently, gene regulatory network (GRN) inference is inherently under-determined [1,2]. In this study, a time-series gene expression data-set derived from a micro-array chip experiment involving a model eukaryotic organism is used for illustrative purposes. The dataset's key characteristics are analyzed to gain insights into the structure and behavior of the underlying biological process. Subsequently, the temporal dynamics of the system are modeled in a discrete-time framework, employing advanced mathematical modeling techniques to capture the complexity and regulatory mechanisms of gene interactions [3,4].

Keywords: Network inference, Mathematical modelling, Data processing.

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DESIGN AND DEVELOPMENT OF ADVANCED MAGNETIC MATERIALS VIA COMPUTATIONAL MATERIAL SCIENCE FOR TECHNOLOGICAL APPLICATIONS

Amdulla O. Mekhrabov[1]* and M. Vedat Akdeniz[2]

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[2]Novel Alloys Design and Development Lab (NOVALAB), Department of Metallurgical and Materials Engineering (Met E), Middle East Technical University (METU), 06800-Ankara, Turkey

Abstract: The presentation will be an overview of the main research thrusts at the "Novel Alloys Design and Development Lab" (NOVALAB) of MetE-METU and at "Novel Materials and Nanotechnologies" Institute of Azerbaijan Technical University (AzTU) in the designing, development and utilizations of advanced multicomponent magnetic materials for technological applications. Fundamental principles and main aspects of *Computational Materials Science (CMS)* for *modeling and simulation based "alloy design"* which has been developed over 45 years by Prof. Mekhrabov, will be presented.

Keywords: Modeling, Simulation, Soft Magnetic Materials, Metallic Glasses, Nanostructured alloys, Glass Formation Ability, Monte Carlo, Reverse Monte Carlo, Molecular Dinamics

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NUMERICAL SOLUTION OF SINGULARLY PERTURBED INITIAL VALUE PROBLEMS WITH DELAY USING B-SPLINE WAVELETS

MEHRDAD LAKESTANI

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ABSTRACT

In this paper, we solve a singularly perturbed initial value problem with delay by using c B-Spline wavelets. The properties of these functions are provided, and by employing the operational matrix of differentiation, a numerical method is genereted over some subintervals that reformulates the problem into a system of algebraic equations. This system can be solved to find the approximate solution. Numerical results demonstrate the efficiency of the method.

Keywords: Singularly perturbed problem; B-Spline wavelets; Delay differential equation.

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14:00–16:00 18.05.2025	**Chair**	**Dr. Nebi Yılmaz**
	Authors	Titles
	İlayda Tarhanacı, Elif Başkaya	On A Heat Equation And Newton- Raphson Method
	Yavuz Dinç, Özlem Akyapı	Lower Bound Estimates for the Blow-up Time of the pLaplacian Equation
	Yavuz Dinç, İrem Üzmez	Nonexistence of Global Solutions for the Hyperbolic Type Equation
	Mitat Uysal, Aynur Uysal, Elif Erçelik	Migrating Birds Optimization-Based Radial Basis Function Method To Find the Optimal Surface from a Given Data Set
	Şeyma Firdevs Hızal, Hasan Bulut, Abdullahi Yusuf	M-Truncated Derivative Applied To The Nonlinear Model With (N+1)-Dimension
	Artion Kashuri, Rozana Liko	Novel Tempered Fractional Integral Inequalities Of Hermite-Hadamard-Mercer Type In The Frame Of Multiplicative Calculus
	Hazal Yüksekkaya	Well-Posedness And Decay Of Solutions for The Porous System with time delay
	Hazal Yüksekkaya	Blow Up of Solutions For The Delayed Beam Equation

14:00–16:00 18.05.2025	**Chair**	**Dr. Gülistan Butakın**
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	Muhammed Burak Gul, Emrah Yilmaz	Proportional Tumor Growth Model On Time Scales
	Esra Ünal Yılmaz, Yeşim Sağlam Özkan	Exact solutions and modulation instability analysis of the (3+1)-dimensional Gross-Pitaevskii equation with periodic potential
	Seyfettin Vural, Veyis Turut	Numerical Comparisons for solving systems of equation of Emden–Fowler type
	Mehmet Cengiz Fidancı, Yasin Yazlık, Murad Khan Hassani	Stability Analysis Of A Three-Dimensional System Of Difference Equations With Quadratic Terms
	Süleyman Şengül	The Element-Free Galerkin Method for Solving the Fractional Schrödinger Equation
	Yunus Aydogdu, Resat Yilmazer	Fractional Solutions to the k-Hypergeometric Differential Equation
	Oktay Şahin, Seydi Battal Gazi Karakoç	Numerical Investigations of the Sawada-Kotera Eqaution with Septic B-spline Functions
	Sadullah Bulut, Muhammed Yiğider	Numerical Solution of the Buckley-Leverett Equation with β-Conformable Fractional Derivative Using Artificial Neural Networks
	Aslı Öner, Sertac Goktas, Yusuf Gurefe	Application of Extended Weierstrass Transform Method to Beta Time Differential Equations

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14:00–16:00 18.05.2025	**Chair**	**Dr. Ayşe Fidan**
	Authors	Titles
	Ajay Kumar, Haci Mehmet Baskonus	Dynamical behavior of analytical soliton solutions for nonlinear partial differential equation
	Berat Süer, Zehra Yücedag	Existence Result of Weak Solution For A Singular kirch hoff type Problem With Steklov Boundary Condition
	Canan Ödemiş, Abdullah Akkurt	Ostrowski-Gruss Type Inequalities Via Katugampula Fractional Integrals
	Amine Mahzum, Mehmet Çitil	Some Applications of Fuzzy Logic Using Fuzzy Data
	Beytullah Yağız, Erdal Eker, Sinan Deniz, Yener Altun	The Performance Advantage Of The Levygto Hybrid Algorithm Compared To Gto
	Yusuf Gürsoy, Nilüfer Topsakal, Figen Kangalgil	Mathematical Modeling Of Crimeancongo Hemorrhagic Fever Spread: An Approach Based On The Sird Model
	Kübra Elif Akbaş, Mahmut Işık	On Asymptotically Equivalent Sequences in Probability
	Duygu Yıldız, Merve Kara, Yasin Yazlık	Global Stability Of An Exponential Difference Equation System
	Hasan Kandemir, Erhan Pişkin	Global Existence, Decay and Nonexistence of Solutions For Lamé Type Equation With a Fractional Time Delay Term

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14:00–16:00 18.05.2025	**Chair**	**Dr. Muhteşem Demir**
	Authors	Titles
	Ali Yılmaz, Abdullah Akkurt, Hüseyin Yıldırım	Fractional Hadamard's Type Inequalities for Exponentially Co-Ordinated Convex Functions
	Sinan Deniz, Beytullah Yağız, Yener Altun, Murat Canayaz	A Comparative Study of Iterative and Noniterative Optimization Methods For Nonlinear Least Squares Problems
	Kübra Elif Akbaş, Mahmut Işık	On Asymptotically Equivalent Sequences in Probability
	Ayşegül Kızılarslan, Ayşegül Çetinkaya	k-Lauricella Hypergeometric Functions
	Zozan Oktan, Cemil Tunç	On The Boundedness And Stability Properties of Solutıons For Fourth Order Nonlinear Stochastic Differential Equations With Variable Delays
	Zozan Oktan, Cemil Tunç	On The Stability of Fifth-Order Nonlinear Stochastic Delay Differential Equations
	Elif Yaşar	Analyzing a Nonlinear Schrödinger Type Equatıon: Dynamical Analysis and Solitary Wave Features
	Muhittin Evren Aydin, Nesibe Tüzün Yılmaz	On Gaussian Curvature of the Cyclic Surfaces

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14:00–16:00 18.05.2025	Chair	Dr. Erkan Sancar
	Authors	Titles
	Zelal Temel	Finite Difference Method for Linear Volterra Integro-Differential Equations
	Zelal Temel	Numerical Approach of Singularly Perturbed Delay Differential Equations With Nonlocal Conditions
	Arzu Akbulut	Applications of bifurcation analysis, sensitivity analysis and modified Kudryashov method
	Ayşe Metin Karakaş, Aslıhan Demir, Sinan Çalık	Topp-Leone Power Garima Distribution: Properties and Applications
	Mine Babaoğlu	Some Spectral Problems Of Diffusion Operator With High Order Approximations
	Ayşe Metin Karakaş, Fatma Bulut, Murat Karakaş	New Lindley Distribution and Applications
	Yasemin Demirel, Oya Mert Coşkun	Determining The Shortest Route For Air Transport After A Possible Fire in Muğla Province Using Artificial Bee Colony Algorithm
	Sibel Şehriban Ataş	Optical solutions for Fokas system in optical fiber

Hall 6	https://eu.bbcollab.com/guest/1a8aca9d61d542d79ace23442a431959

14:00–16:00 18.05.2025	Chair	Dr. Hasan Kandemir
	Authors	Titles
	Cebrail Saka, Ahmet Öteleş	Eigenvalues Of Complex Skew-Symmetric Circulant Matrices
	Merve İlkhan Kara	On New Paranormed Sequence Spaces
	Sinem Tarsuslu Yılmaz	Intuitionistic Fuzzy Be-Algebras W.R.T. (T, St)-Norm
	Alperen Kızılay, Atakan Tuğkan Yakut	The New Modified Saban Frame And The Evolution Of Curves Based On Modified Saban Frame On S 1 2 And H 2 0
	Aleyna Damar, Hıfsı Altınok	Generalized ⬚-Statistical Convergence Of Order ⬚
	Mithat Kasap, Hıfsı Altınok	Some Properties Of The Sequence Class
	Hayatem Hamal	Parametric Extension of New Generalization of SzászMirakjan Operators
	Hilal Şengür, Hatice Aslan	Degree Of Approximation By Matrix Means Of Hexagonal Fourier Series

Hall 7	https://eu.bbcollab.com/guest/52a50ed2b8fc4eb0975c9e7c383e19cc

14:00–16:00 18.05.2025	Chair	Dr. Ayşe Demirhan
	Authors	Titles
	Ümmühan Yıldız, Emrah Yılmaz	Supply And Demand Model With Proportional Derivatives On Time Scales
	Gülden Kapusuz, Ahmet Şahiner, Nurullah Yılmaz	A New Approach To The Ip (0<p≤1) Minimizatıon Problem With Tight Frame And it is Image Processing Application
	Eyüp Buğra Yalçın, Mehmet Çağrı Yılmazer, Mikail Et	On Pell Calculus
	Mustafa Cemil Bişgin	Some New Sequence Spaces Derived By The Composition Of Binomial Matrix And Quintet Band Matrix
	Mustafa Cemil Bişgin	New Sequence Spaces Defined By The Domain Of Sextuple Band Matrix
	Ahmet Şahiner, Sena Ülgen Çetinkaya	Increasing Fruit Productivity with Modern Modeling Methods
	Ümmügülsün Çağlayan, İbrahim Gökcan, Ali Hikmet Değer	Lorentz Matrix Multiplication: Exploring Its Relationship With Fibonacci and Lucas Numbers
	Selahattin Aslan	Tool Frame of Robot End-Effector Using Two Ruled Surfaces Corresponding to the Hyper-Dual Curve

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14:00–16:00 18.05.2025	Chair	Dr. Yunus Özisçi
	Authors	Titles
	Muhammet Emin Aydın	Generalized Lacunary Statistical Convergence of Modulus Function Sequences
	Meltem Öğrenmiş	Multiplicative Equiaffine Curves and Their Properties
	Meltem Öğrenmiş	Characterization of Plane Curves With Constant Multiplicative Equiaffine Curvature
	Çiğdem Süsoy Atalar, Tevfik Şahin	Fractional Derivatives: Definitions and Properties
	Kübra Tunc, Alper Osman Oğrenmis	Curves And Their Properties In Dynamic Geometry
	Yusuf Özdemir, Mustafa Yeneroğlu	On The Mangenetic Curves According To The Ribbon Frame In Minkowski Space
	Sultan Ceritli, Münevver Yıldırım Yılmaz	Pseudo Null And Null Smarandache Curves In E3 1 And Theİr Characterizations
	Gamze Yaprak, Münevver Yıldırım Yılmaz	Generalized V-Mannheim Curves In Eˆ4 And Their Characterizations

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Hall 9	https://eu.bbcollab.com/guest/bcca08006267476db05bfa037c2f4ef9
14:00–16:00 18.05.2025	**Chair** **Dr. Hazal Yüksekkaya**

Authors	Titles
Gül Sinem Keleş, Birol Altın	A Note On Demi Weak Almost Limited Operators
Meral Süer, Mehmet Şirin Sezgin	Ideals and Gröbner Bases Of Some Pseudosymmetric Numerical Semigroup Families
Berfin Karadağlı, Saliha Erboğa, Nurettin Bağırmaz	The Analysis of Lgs Success Via Rough Set Theory: The Case Of Siverek And Savur
Mehmet Sait Alakuş, Sedat İlhan	On Some Perfect Numerical Semigroups
Dila Karataş, Fulya Yörük Dere	Existence and Uniqueness of Solutions For Fractional Boundary Value Problems Involving Caputo-Hadamard Fractional Derivatives
Ghassan Mohammed Abdullah Alomaısı, Nurettin Bağırmaz	On The Separation Axıom of Topological Spacen M-Space and Tm-Space
Davood Ahmadian, Vahid Norouzi, Fevzi Erdogan, Sevda Ozdemir Calikusu	Hybrid Jump-Heston and Bidirectional LSTM Model with Attraction Mechanism for S&P 500 Forecasting
İlayda Tarhanacı, Elif Başkaya	On a Heat Equation and Newton- Raphson Method
Sezer Erdem, Serkan Demiriz	On the Domain of 4-dimensional Catalan Matrix in the Space of Absolutely Summable Double Sequences
Latifa Agamalieva, Yusif Gasimov	Some Problems For The Eigen values Of The Elliptic Operators
Melike Karta	Numerical Solutions Of The Generalized Regular Long Wave (Grlw) Equation Using Four Different Operator Splitting Algorithms Combined With The Finite Element Method

Hall 10	https://eu.bbcollab.com/guest/8cd873b4d21747f3bdc46cad11576903
14:00–16:00 **18.05.2025**	**Chair** **Dr. Yavuz Dinç**

Authors	Titles
Erhan Yılmaz, Özgü Can	Few-Shot Learning Meets Explainable AI: Towards Smarter Anomaly Detection
Özlem Ayça Kaplan, Fatma Nur Gürbüz, Elif Yıldırım, Zerrin Toker	Statistical Literacy in Middle School Via Interdisciplinary Connections
Ali İhsan Mut, Şeyda Bircan	An Analysis of 9th Grade Mathematics Textbook Prepared In Accordance With Türkiye Century Maarif Model Curriculum In The Context of Congruence and Similarity
Sedat Karadağ, Senem Şahan Vahaplar, M. Hakkı Ersoy, Ahmet Feyzioğlu	Development of a Domain-Specific AI Platform Based On Small Language Models
Okan Dardağan, Hakan Altunay	Multi-layer Artificial Neural Networks in Optimization of Predictive Maintenance Processes
Osman Tufan, Okan Dardağan, Hakan Altunay	Prediction of Concrete Compressive Strength Using Mamdani-Type Fuzzy Inference System
Teubé Cyrille Mbainaissema, Déthié Dione	On the reducibility of weighted composition operators
Khayyam Heydarov, Şükrü Kitiş	Detection of the E-Commerce Credit Card Fraud With Data Mining
Ayşe Kübra Demirel	On Some Fractional Integral Inequalities For Strongly Modified $(\alpha, h\text{-}m)$-Convex Functions
Ercan Tunç, Adil Kaymaz	A Study On Oscillation Of Neutral Differential Equations With Damping Term

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