

Institute of Mathematics and Informatics
Bulgarian Academy of Sciences

Second International Conference
MATHEMATICS DAYS IN SOFIA

July 10-14, 2017, Sofia, Bulgaria



Scientific Programme

<http://mds2017.math.bas.bg/>

Organizers



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The Second International Conference *Mathematics Days in Sofia* is held in Sofia, Bulgaria, in the period July 10 – 14, 2017.

The Conference is organized by the *Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences* in collaboration with the *Union of the Bulgarian Mathematicians* and the *Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski"*.

The purpose of the events *Mathematics Days in Sofia* is to present the current state of the art in all areas of mathematics and mathematical aspects of computer science and their applications.

One of the main goals of the Conference is to bring together Bulgarian mathematicians and computer scientists working all over the world. In this way, we enrich the relations between the mathematicians working in Bulgaria and the Bulgarian mathematical diaspora.

About 250 scientists from more than 40 countries participate in the second issue of the Conference. They present more than 170 invited talks and communications.

We express our special thanks to the *Bulgarian National Science Fund, Georgi Chilikov Foundation, and Balkam Group Ltd., and Nova Trade Ltd.* for the financial support and sponsorship.



The Conference is dedicated to the 70th anniversary of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences (IMI-BAS).

IMI-BAS was created shortly after the end of WW II by the effort and high professionalism of a generation of Bulgarian mathematicians whom we now thankfully style the pivots of Bulgarian mathematics.

The date **27 October 1947** is rightly considered the birth date of IMI, when the Executive Council of the Academy confirmed the plan of the scientific activity in 1947/1948.

Since its creation in 1947 IMI has been a leading Bulgarian centre for research and training of highly qualified specialists and exercising an efficient, long-range, consistent policy related to the fundamental trends in the development of mathematics, computer science and information technologies.

Mission of IMI:

- Development of fundamental and applied research in mathematics and informatics in compliance with the national and European priorities, integration of IMI into the European Research Area;
- Scientific research in the fields of mathematical structures, mathematical modeling and mathematical informatics, enriching the theoretical foundations of mathematics and informatics and leading to innovative applications in other sciences, in information and communication technologies, industry and society;
- Application of mathematics and informatics in the national educational programmes and educational processes at all levels in the country;
- Establishing the Institute of Mathematics and Informatics as a leading research centre in Bulgaria in the field of mathematics and informatics.

Programme Committee

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Mini-symposia Organizers

Mathematical Modelling and Scientific Computing

Ivan Bazhlekov
(IMI, BAS, Bulgaria)

Raytcho Lazarov
(Texas A&M University, USA)

Peter Minev
(University of Alberta, Canada)

Peter Rashkov
(IMI, BAS, Bulgaria)

Nonlinear Waves and Integrability

Rossen Ivanov
(Dublin Institute of Technology, Ireland)

Georgi Grahovski
(University of Essex, UK)

Optimal Codes and Related Topics

Tsonka Baicheva,
Silvia Boumova,
Peter Boyvalenkov,
Konstantin Delchev,
Emil Kolev,
Hristo Kostadinov,
Stela Zhelezova
(IMI, BAS, Bulgaria)

Topology

Ekaterina Mihaylova
(University of Architecture, Civil
Engineering, and Geodesy, Bulgaria)

Vesko Valov
(Nipissing University, Canada)

Common Structure of the Program Schedule

July 10

09:30 – 10:00	Opening Session	Sofia Hotel Balkan
10:00 – 10:50	Talk by the winner of IMI Prize	
10:50 – 11:20	<i>coffee break</i>	
11:20 – 13:00	Plenary panel 1	
15:00 – 16:30	Section/mini-symposium panels 1	IMI-BAS
16:30 – 17:00	<i>coffee break</i>	
17:00 – 18:30	Section/mini-symposium panels 2	
19:30 – 21:00	Welcome party	Archaeological Museum

July 11

09:00 – 10:40	Plenary panel 2	Sofia Hotel Balkan
10:40 – 11:10	<i>coffee break</i>	
11:10 – 12:50	Plenary panel 3	
15:00 – 16:30	Section/mini-symposium panels 3	IMI-BAS
16:30 – 17:00	<i>coffee break</i>	
17:00 – 18:30	Section/mini-symposium panels 4	

July 12

09:30 – 11:10	Plenary panel 4	Sofia Hotel Balkan
11:10 – 11:40	<i>coffee break</i>	
11:40 – 12:30	Plenary panel 5	
14:30 – 16:00	Section/min-symposium panels 5	IMI-BAS
16:00 – 16:30	<i>coffee break</i>	
16:30 – 18:00	Section/mini-symposium panels 6	IMI-BAS
18:00 – 19:00	Happy hour	

July 13

09:30 – 11:10	Plenary panel 6	Sofia Hotel Balkan
11:10 – 11:40	<i>coffee break</i>	
11:40 – 12:30	Plenary panel 7	

14:30 – 16:00	Section/mini-symposium panels 7	IMI-BAS
16:00 – 16:15	<i>coffee break</i>	
16:15 – 16:45	Poster session	
17:00 – 19:00	Sofia Sightseeing Tour	Sofia Historical Center

20:00 – 23:45	Official Dinner	Sofia Hotel Balkan
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July 14

9:30 – 11:00	Section/mini-symposium panels 8	IMI-BAS
11:00 – 11:30	<i>coffee break</i>	
11:30 – 13:00	Section/mini-symposium panels 9	

14:30 – 16:00	Section/mini-symposium panels 10	IMI-BAS
16:00 – 16:30	<i>last cup of coffee before departure</i>	

*) Depending of the number of included talks and their types some of the section/mini-symposium panels are slightly shorter or longer.

Opening Session

Sofia Hotel Balkan

July 10, 09:30 – 10:00

- Opening by the Vice President of the Republic of Bulgaria
Mrs. Iliana Iotova
- IMI Mathematics Prize Awarding for 2017

Plenary Talks

Sofia Hotel Balkan

July 10, 10:00 – 10:50

Chair: Stanimir Troyanski

- ❖ Kiril Datchev. Wave Asymptotics for Manifolds with Cylindrical Ends

July 10, 11:20 – 13:00

Chair: Vesselin Drensky

- ❖ Efim Zelmanov. Infinite Dimensional Algebras and Superalgebras
- ❖ Yuri Tschinkel. Rationality Problems

July 11, 09:00 – 10:40

Chair: Johann Davidov

- ❖ Vestislav Apostolov. The Generalized Kähler Geometry of Holomorphic Symplectic Manifolds
- ❖ Ludmil Katzarkov. Lattices, Filtrations and Some Applications

July 11, 11:10 – 12:50

Chair: Vesselin Petkov

- ❖ Plamen Stefanov. Local and Global Boundary Rigidity
- ❖ Nikolay Tzvetkov. Weak Turbulence for the Nonlinear Schroedinger Equation: a Connection between the Scattering Theory and the Arnold Diffusion

July 12, 09:30 – 11:10

Chair: Petar Kenderov

- ❖ Hristo Sendov. Stronger Rolle's Theorem for Complex Polynomials
- ❖ Nikolai Nikolov. Boundary Behavior of Invariant Metrics in Complex Analysis

July 12, 11:40 – 12:30

Chair: Mladen Savov

- ❖ Jean Jacod. Statistics for High-frequency Observations of a Stochastic Process

July 13, 09:30 – 11:10

Chair: Peter Minev

- ❖ Pavel Bochev, Marta D'Elia, Mauro Perego, Kara Peterson, Denis Ridzal. Optimization-Based Property Preserving Methods, or Going Boldly Beyond Compatible Discretizations
- ❖ Ludmil Zikatanov. Operator Preconditioning: Theory, Practice, and Robustness

July 13, 11:40 – 12:30

Chair: Blagovest Sendov

- ❖ Emil Horozov. Automorphisms of Algebras, Multiple Orthogonal Analogs of Classical Orthogonal Polynomials and Bi-orthogonal Ensembles

Section
“Mathematical Logic, Algebra, and Combinatorics”
IMI, Hall 578

July 10, 15:00-16:30 – Panel 1

Chair: Valentin Iliev

- Ivan Chipchakov. On the Brauer p -dimension of a Henselian Discrete Valued Field of Prime Residual Characteristic p
- Özen Özer. Calculation of Fundamental Unit for an Especial Type of Real Quadratic Number Fields
- Dimiter Dobrev. Incorrect Moves and Testable States

July 10, 17:00-18:30 – Panel 2

Chair: Ivan Chipchakov

- Zhivko Petrov. On an Equation Involving Fractional Powers with Prime Numbers of a Special Type
- Islem Ghaffor. Counting Twin Primes
- Islem Ghaffor. An Equivalent Problem to the Collatz Conjecture

July 11, 15:00-16:30 – Panel 3

Chair: Petar Iliev

- Dimitar Guelev. Shifting Coalitions in Games with Preference-ordered Temporal Objectives
- İbrahim Şentürk, Tahsin Oner. A New View on Intermediate Syllogisms
- Hristo Iliev. Supperabundant Components of the Hilbert Scheme of Curves Using Double Covers of Irrational Curves

July 11, 17:00-18:30 – Panel 4

Chair: Daniela Nikolova-Popova

- Şehmus Fındık. Approximation of the CBH Formula in Various Relatively Free Lie Algebras
- Khristo Boyadzhiev. The Binomial Transform and Euler’s Series Transformation
- İbrahim Canak, Ümit Totur, Zerrin Önder. On Tauberian Theorems for Cesàro Summable Double Sequences of Fuzzy Numbers

July 12, 14:30-16:00 – Panel 5

Chair: Efim Zelmanov

- ❖ *Antonio Giambruno*. Central Polynomials versus Polynomial Identities
- ❖ *Mikhail Zaicev*. Codimension Growth of Solvable Lie Superalgebras

July 12, 16:30-18:00 – Panel 6

Chair: Mikhail Zaicev

- *Daniela Nikolova-Popova, Luise-Charlotte Kappe, Eric Swartz, Spyros Magliveras, Michael Epstein*. On the Covering Number of Small Symmetric, and Alternating Groups, and Some Sporadic Simple Groups
- *Vesselin Drensky*. Bicommutative Algebras
- *Elitza Hristova*. Decomposition of Cohomology of Vector Bundles on Homogeneous Ind-spaces

July 13, 14:30-16:00 – Panel 7

Chair: Tsetska Rashkova

- ❖ *Leonid Bedratyuk*. Some Applications of Classical Invariant Theory to Combinatorics
- ❖ *Martin Kassabov, Igor Pak*. Tricks with Amenable Groups

July 14, 11:30-13:00 – Panel 9

Chair: Rumen Daskalov

- ❖ *Iliya Bouyukliev*. Hadamard Matrices and Cryptographic Properties of Boolean Functions
- ❖ *Petar Iliev*. An Introduction to Lower Bounds on Formula-size in Modal Logic

Section
“Geometry and Topology”
IMI, Hall 403

July 10, 15:00-16:30 – Panel 1

Chair: Valentin Gutev

- ❖ *Giuseppina Barbieri, Dikran Dikranjan, Anna Giordano Bruno, Hans Weber.* Dirichlet Sets and Arbault Sets of the Circle Group
- ❖ *Mitrofan Choban.* Baire Spaces and Compactness

July 10, 17:00-18:30 – Panel 2

Chair: Milan Zlatanović

- *Sinem Güler, Sezgin Altay Demirbağ.* m-Quasi Einstein Spacetime and Its Applications
- *Cornelia-Livia Bejan, Ilhan Gul.* Metrics on the Cotangent Bundle of a Weyl Manifold
- *Viktoria Bencheva.* Curvature of a Barycentric Curve and Applications to Trajectories of Rational Bézier Curves

July 11, 15:00-16:30 – Panel 3

Chair: Luigi Vezzoni

- ❖ *David Calderbank.* Toric Contact Geometry in Arbitrary Codimension
- ❖ *Miguel Brozos-Vázquez, Eduardo García-Río, Peter Gilkey, Xabier Valle-Regueiro.* Quasi-Einstein Manifolds

July 11, 17:00-18:30 – Panel 4

Chair: Nurettin Cenk Turgay

- *Milan Zlatanović, Stefan Ivanov.* Connections on a Non-symmetric (Generalized) Riemannian Manifold
- *Hristo Manev.* Almost Contact B-metric Structures and the Bianchi Classification of the Three-dimensional Lie Algebras
- *Yana Aleksieva, Georgi Ganchev, Velichka Milousheva.* Lorentz Surfaces with Parallel Normalized Mean Curvature Vector Field in Pseudo-Euclidean 4-Space with Neutral Metric

July 12, 14:30-16:00 – Panel 5

Chair: Eduardo García-Río

- ❖ Tony Pantev. Foliations, Symplectic Structures, and Potentials
- ❖ Luigi Vezzoni. The Calabi-Yau Problem on the Kodaira-Thurston Manifold

July 12, 16:30-18:00 – Panel 6

Chair: Cornelia-Livia Bejan

- Nurettin Cenk Turgay. On the Gauss Map of Lorentzian Surfaces with Zero Mean Curvature in Semi-Riemannian Space-forms of Arbitrary Dimension
- Krasimir Kanchev, Georgi Ganchev. Canonical Weierstrass Representations for Minimal Surfaces in Four-dimensional Euclidean or Minkowski Space
- Alev Kelleci, Mahmut Ergut, Nurettin Cenk Turgay. Geometrical Properties of Surfaces Endowed with a Canonical Principal Direction in the 4-dimensional Euclidean Space

July 13, 14:30-16:00 – Panel 7

Chair: David Calderbank

- ❖ Slawomir Dinew. Geometry of Minimum Sets of Strictly Plurisubharmonic Functions
- ❖ Ivan Minchev. The Yamabe Equation on 3-Sasakian Manifolds

July 14, 09:30-11:00 – Panel 8

Chair: Toni Pantev

- ❖ Bogdan Georgiev. Some Recent Estimates on Nodal Geometry in the High-energy Limit
- ❖ Todor Milanov. The Period Map for Quantum Cohomology of P^2

July 14, 14:30-15:45 – Panel 10

Chair: Mitrofan Choban

- ❖ Valentin Gutev. Selections and Deleted Symmetric Products
- Joseph Bak, Strashimir Popvassilev. The Evolution of Cauchy's Closed Curve Theorem and Newman's Simple Proof

Section “Analysis” IMI, Hall 278

July 10, 15:00-16:30 – Panel 1

Chair: Geno Nikolov

- ❖ Hristo Djidjev. Solving Optimization Problems Using Quantum Annealing
- ❖ Peter Dragnev, *David Benko*, *Dan Coroian*, *Ramon Orive*. Biased Coin Toss and Nash Equilibrium

July 10, 17:00-18:30 – Panel 2

Chair: Peter Dragnev

- Lubomir Markov. Representation of Certain Euler-type Sums via Values of the Riemann Zeta Function
- Özen Özer, *Zubair Nisar*. A Study on Fixed Points for Locally Contractive Mappings in a Complete $G_{\mathcal{F}}$ -metric Like Spaces
- Martin Stanev. Log-Convexity of Weighted Area Integral Means of H^p Functions on the Upper Half-plane

July 11, 15:00-16:30 – Panel 3

Chair: Stanimir Troyanski

- ❖ *Vern Paulsen*, *Simone Severini*, *Dan Stahlke*, Ivan Todorov, *Andreas Winter*. An Operator Algebraic Approach to Non-signalling Correlations
- ❖ Atanas Stefanov, *Vladimir Georgiev*. On the Classification of the Spectrally Stable Standing Waves of the Hartree Problem

July 11, 17:00-18:30 – Panel 4

Chair: Lubomir Markov

- *Galina Borisova*, Steliana Atanasova. Nonselfadjoint Operators, Triangular Models, and the Soliton Theory
- Miroslav Hristov. Bourgain Algebras of Subalgebras of $A(\mathbb{D})$ on the Unit Disk
- Jasmina Veta Buralieva, *Katerina Hadzi-Velkova Saneva*, *Sanja Atanasova*. The Stockwell Transform and Asymptotic Behavior of Distributions

Section “Differential Equations and Mathematical Physics”

IMI, Hall 478

July 12, 14:30-16:00 – Panel 5

Chair: Nikolay Tzvetkov

- ❖ Peter Topalov. Spatial Asymptotic Expansions in the Incompressible Euler Equation
- ❖ Alexander Pushnitski. Perturbation Theory for Functions of Self-adjoint Operators

July 12, 16:30-18:00 – Panel 6

Chair: Iliya Iliev

- ❖ Georgi Raikov. Pauli Operators with Almost Periodic Magnetic Fields
- ❖ Boyan Sirakov. A Priori Bounds for Elliptic Differential Inequalities via Regularity Estimates

July 13, 14:30-16:00 – Panel 7

Chair: Peter Topalov

- ❖ Stepan Tersian. Multiplicity of Periodic Solutions for $2n^{\text{th}}$ -order p -Laplacian Differential Equations
- ❖ Milena Stanislavova. Periodic Traveling Waves of the Short Pulse and Ostrovsky Equations: Existence and Stability

July 14, 09:30-11:30 – Panel 8

Chair: Georgi Raikov

- Georgi Boyadzhiev, Nikolay Kutev. Comparison Principle for Weakly-coupled Non-cooperative Elliptic and Parabolic Systems
- David Jerison, Nikola Kamburov. The Space of One-phase Free Boundary Solutions in the Plane
- Alexander Fabricant, Nikolai Kutev, Tsviatko Rangelov. Estimates from Below for the First Eigenvalue of the p -Laplacian
- Vesselin Vatchev. On Multisoliton Solutions and Solitons Interactions

Section “Applied Mathematics”

IMI, Hall 055

July 10, 15:00-16:30 – Panel 1

Chair: Ludmil Zikatanov

- ❖ *Beiping Duan, Bangti Jin, Raytcho Lazarov, Joseph Pasciak, Zhi Zhou.* Space-Time Petrov-Galerkin FEM for Fractional Diffusion Problems
- ❖ *Svetozar Margenov.* Solvers of Optimal Complexity: from Sparse SPD Systems to a Class of Non-Local Problems

July 10, 17:00-18:30 – Panel 2

Chair: Virginia Kiryakova

- *Aleksandar Cvetković, Gradimir Milovanović, Nevena Vasović.* Differential Equation for a Class of Orthogonal Polynomials
- *Sertan Alkan, Kenan Yildirim.* Numerical Solutions of a Coupled Systems of Fractional Integro-differential Equations
- *Kenan Yildirim.* A Nonlinear Plate Control without Linearization

July 11, 15:00-16:15 – Panel 3

Chair: Maxim Todorov

- ❖ *Milen Ivanov, Nadia Zlateva.* Long Orbit or Empty Value Principle, Fixed Point and Surjectivity Theorems
- *Mihail Hamamdjiev, Milen Ivanov.* New Multirectional Mean Value Inequality

July 11, 17:00-18:30 – Panel 4

Chair: Mladen Savov

- *Iva Rashkova, Jérémie Gallien.* Public Procurement of Multiple Health Products: The Dynamic Inventory Budget Allocation Problem
- *Krasimira Kostadinova, Leda Minkova.* A Generalization of the Pólya Process
- *Meqlena Lazarova, Leda Minkova.* Noncentral Pólya–Aeppli Process and Applications

July 12, 14:30-16:00 – Panel 5

Chair: Nadia Zlateva

- ❖ Maxim Todorov. Generalization of the Concept of Motzkin Decomposable Closed Convex Sets
- ❖ Viktor Todorov. Nonparametric Option-Implied Volatility

July 12, 16:30-18:00 – Panel 6

Chair: Viktor Todorov

- Mira Bivas. A Nonautonomous Olech Type Result
- Said Beloul. A Common Fixed Point Theorem for Weakly Compatible Mappings Satisfying Generalized Condition (B) in Metric-like Spaces
- Lourabi Hariz Bekkar, Abdelouahab Mansour. On Solvability of Sylvester Equation via Coupled Fixed Point

July 13, 14:30-16:00 – Panel 7

Chair: Maroussia Slavtchova-Bojkova

- Gleb Haynatzki. Statistical Model of Microenvironment-Dependent Carcinogenesis: Estimation and Applications
- Natalya Litvinenko. Estimation of Psychological Personality Factors by Combining Different Tests. Bayesian Networks
- Ana Staneva. Statistical Inference of Multitype Branching Processes with Markov Chain Monte Carlo Methods

July 13, 16:15-16:45 – Poster session

- Radoslav Mavrevski. Performance Comparison of Model Selection Criteria by Generated Experimental Data
- Fatima Sapundzhi. Scoring Functions for Molecular Docking Studies
- Metodi Traykov. Algorithms for Proteins Folding Prediction: 3D Cubic Lattice in HP Model
- Georgi Mitsov. Discontinuous Petrov-Galerkin Methods for the Time-dependent Maxwell Equations

July 14, 09:30-11:00 – Panel 8

Chair: Geno Nikolov

- Mark Iwen. Sparse Fourier Transforms: A General Framework with Extensions
- Diana Stoeva. Invertibility of Frame Multipliers and Formulas for the Inverses
- Mohammed Beggas, Haiour Mohamed. L_∞ -error Estimate of Schwarz Method for Generalized Elliptic Quasi-variational Inequalities

July 14, 11:30-13:00 – Panel 9

Chair: Krasimira Vlachkova

- Valentin Todorov, Maria Anna Di Palma, Michele Gallo. Visual Tools for Three-way Analysis
- Penka Mayster, Jivka Slavkova. The Moments of Subordinated Lévy Processes
- Mariia Beliaeva. Mathematical Problems in Cancer Research

July 14, 14:30-16:00 – Panel 10

Chair: Penka Mayster

- Yavor Stoev. Martingale Optimal Transport with Stopping
- Krassimira Vlachkova. Comparing Bezier Surfaces for Coincidence
- Özlem Ersoy Hepson, Alper Korkmaz. Higher Order Trigonometric B-spline Approximates

Section
“Mathematical Aspects of Computer Science”
IMI, Hall 256

July 11, 17:00-18:30 – Panel 4

Chair: Galina Bogdanova

- Lyubomir Filipov, Zlatko Varbanov. Fuzzy Matching of Strings
- Malinka Ivanova. Contemporary Cryptographic Methods for Secure Web Services
- Negoslav Sabev. Introduction to Requirements and Evaluation of Web Accessibility

July 14, 14:30-15:45 – Panel 10

Chair: Stefka Bouyuklieva

- ❖ Plamen Koev. New Expressions for the Extreme Eigenvalues of Beta Random Matrices
- Zlatko Varbanov, Maya Hristova. Constructing DNA Codes by Additive Self-dual Codes

Section “Mathematics Education and History of Mathematics”

IMI, Hall LT4

July 10, 15:00-15:45 – Panel 1

Chair: Petar Kenderov

- ❖ Rumena Kaltinska. Virtual Museum "Mathematics and Informatics in Bulgaria"

July 10, 17:00-18:30 – Panel 2

Chair: Albena Vassileva

- Mariche Lazarovska, Hristina Leova. Solving Real-life Problems for Increasing the Motivation of Students in Learning Mathematics
- Tsvetelina Petrova-Ruseva. The Synergistic Idea of Self-training and Self-educating Realized in the System Jump Math
- Jordan Tabov, Borislav Lazarov. Wasan Under a Historical Inversion

July 11, 15:00-16:30 – Panel 3

Chair: Toni Chehlarova

- Bulent Gaytanly, Guner Ilcan. A Web-based Application in Teaching Mathematics to Secondary School Students
- Guner Ilcan. A Web-based Teaching of Quadratic Functions
- Tanya Otsetarova, Kristian Georgiev, Konstantin Delchev. Results on Tilings with Walkup Structure and Their Properties

July 11, 17:00-18:00 – Panel 4

Chair: Jordan Tabov

- Petar Kenderov, Toni Chehlarova. Extending the Class of Mathematical Problems Considered in School Education
- Toni Chehlarova, Petar Kenderov. Two Online Competitions in Support of Inquiry Based Mathematics Education

Mini-symposium

“Mathematical Modeling and Scientific Computing”

IMI, Hall 256

July 10, 15:00-16:30 – Panel 1

Chair: Peter Rashkov

- Nikolai Kutev, Milena Dimova, Natalia Kolkovska. Necessary and Sufficient Conditions for Finite Time Blow up of the Solutions to Boussinesq Equation
- Natalia Kolkovska, Veselina Vucheva. Finite Difference Schemes for Sixth Order Boussinesq Equation
- Ivan Hristov, Stefka Dimova, Radoslava Hristova. Numerical Simulation of 2D Sine-Gordon Waves

July 10, 17:00-18:30 – Panel 2

Chair: Nikolai Kutev

- Daniela Georgieva, Lubomir Kovachev. Mathematical Modelling of the Processes of Generation, Interaction and Reduction of Optical Filaments
- Emilia Bazhlekova, Ivan Bazhlekov. Subordination Approach to Time-fractional Diffusion-wave Equation of Distributed Order
- Ivan Bazhlekov, Emilia Bazhlekova. Fractional Derivative Model for Diffusion-controlled Adsorption at Liquid/Liquid Interface

July 11, 15:00-16:30 – Panel 3

Chair: Ivan Bazhlekov

- Maroussia Slavtchova-Bojkova, Kaloyan Vitanov. Statistical Inference in Branching Processes and Applications in Cancer Recurrence
- Peter Rashkov. Phase-plane Analysis of a Model for Cross-feeding in a Chemostat
- Sina Baghsorkhi, Nikolay Ikononov, Sergey Suetin. A New Framework for Numerical Analysis of Nonlinear Systems: the Significance of the Stahl's Theory and Analytic Continuation via Padé Approximants

July 13, 14:30-16:00 – Panel 7

Chair: Pavel Bochev

- Owe Axelsson, Dalibor Lukáš. Preconditioning Methods for Eddy Current Optimally Controlled Time-harmonic Electromagnetic Problems
- Alexander Ern. Analysis of the Edge Finite Element Approximation of the Maxwell Equations with Low Regularity Solutions

July 14, 09:30-11:00 – Panel 8

Chair: Raytcho Lazarov

- Jean-Luc Guermond, Bojan Popov. Invariant Domain Approximations of Nonlinear Hyperbolic Systems
- Stanislav Harizanov, Ivan Lirkov, Ivan Georgiev. Advanced CT Data Processing: Denoising and Feature Extraction
- Maya Neytcheva. Experiences in Solving Discrete PDE-constrained Optimization Problems

July 14, 11:30-13:00 – Panel 9

Chair: Maya Neytcheva

- Yanping Lin. Linear and Quadratic Immersed Finite Element Methods for the Multi-Layer Porous Wall Model for Coronary Drug-Eluting Stents
- Peter Minev, Petr Vabishchevich. Splitting Schemes for Unsteady Problems Involving the Grad-div Operator
- Phillippe Angot. Mathematical Modelling Towards the Open Problem of Incompressible Viscous Flow at a Fluid-porous Interface

Mini-symposium “Nonlinear Waves and Integrability”

IMI, Hall 478

July 10, 15:00-16:30 – Panel 1

Chair: Rossen Ivanov

- ❖ Vladimir Gerdjikov. Two-component NLS equations: Hamiltonian Properties and Generalized Fourier Transforms
- ❖ Ricardo Carretero-González. Small Vortex Clusters in Bose-Einstein Condensates: Theory and Experiments

July 10, 17:00-18:30 – Panel 2

Chair: Ricardo Carretero-González

- ❖ Michail Todorov. Long-time Dynamics and Interaction of Ultrashort Light Pulses
- ❖ Georgi Grahovski, Vladimir Gerdjikov, Rossen Ivanov. Integrable Nonlocal Multi-component Equations with PT and CPT Symmetries

July 11, 15:00-16:30 – Panel 3

Chair Michail Todorov

- ❖ Dimitar Mladenov. Bianchi Cosmological Models and Generalized Toda Lattices
- ❖ Aleksander Stefanov, Vladimir Gerdjikov. New Examples of Two-component NLS Equations

July 11, 17:00-18:30 – Panel 4

Chair: Georgi Grahovski

- ❖ Nikola Stoilov, Christian Klein. Numerical Study of Gradient Catastrophe Stability in Integrable Dispersive Equations
- ❖ Rossen Ivanov. Soliton and Cuspon Solutions of the Camassa-Holm Equation

Mini-symposium “Optimal Codes and Related Topics”

IMI, Hall 503

July 10, 15:00-16:30 – Panel 1

Chair: Ivan Landjev

- Edward Saff. Universal Lower Bounds on Energy of Spherical Codes
- Douglas Hardin. Next Levels Universal Lower Bounds – Lifting the Levenshtein Framework
- Dmitrii Zinoviev, Victor Zinoviev. On the Spherical Code $(4; \rho; 9)$

July 10, 17:00-18:30 – Panel 2

Chair: Ivan Landjev

- Alexander Davydov, Stefano Marcugini, Fernanda Pambianco. Further Results on Binary Codes Obtained by Doubling Construction
- Iliya Bouyukliev, Maya Hristova. A Method for Construction of Orthogonal Arrays
- Galina Bogdanova, Galya Georgieva-Tsaneva, Todor Todorov. Provision of Safety of Interactive Systems – Problems and Solutions

July 11, 15:00-16:30 – Panel 3

Chair: Victor Zinoviev

- Alexander Davydov, Stefano Marcugini, Fernanda Pambianco. Upper Bounds on the Smallest Size of an Almost Complete Cap in $PG(N, q)$
- Nikolay Yankov, Damyan Anev. New Self-dual $[78, 39, 14]$ Codes an Automorphism of Order 13
- Rumen Daskalov, Elena Metodieva. On the Construction of Small (l, t) -blocking Sets in $PG(2, q)$

July 11, 17:00-19:00 – Panel 4

Chair: Victor Zinoviev

- Sven Puchinger, Sven Muelich, Martin Bossert. On the Success Probability of Decoding (Partial) Unit Memory Codes
- Dmitry Osipov, Dmitry Titov. Sequential Decoding on Syndrome Trellises for Nonparametric Detection
- Sven Muelich, Martin Bossert. Applying Convolutional Codes to Key Extraction Using Ring Oscillator PUFs
- Zlatko Varbanov, Maya Hristova. New Lower Bounds for the Number of ACG Codes over F_4

July 12, 14:30-16:00 – Panel 5

Chair: Leo Storme

- *Leonid Bassalygo, Vladimir Lebedev, Victor Zinoviev*. On m-specially Resolvable BIB Designs and q-ary Constant Weight Codes
- *Stela Zhelezova*. A Method for Constructing Splitting $(v, u \times c, \lambda)$ BIBDs
- *Tsonka Baicheva, Svetlana Topalova*. On the Size of Optimal Strongly Conflict-avoiding Codes for 3, 4 and 5 Active Users

July 12, 16:30-18:30 – Panel 6

Chair: Leo Storme

- *Stefka Bouyuklieva, Iliya Bouyukliev*. Dual Transform through Characteristic Vectors
- *Valentin Bakoev*. Fast Implementation of the ANF Transform
- *Assia Rousseva*. Upper and Lower Bounds on the Size of t-fold Affine Blocking Sets
- *Mariya Dzhumalieva-Stoeva, Venelin Monev*. An Implementation of Hash Table for Classification of Combinatorial Objects

July 13, 14:30-16:00 – Panel 7

Chair: Tsonka Baicheva

- *Lisa Hernandez Lucas, Ivan Landjev, Leo Storme, Peter Vandendriessche*. On the Geometrical Sunflower Bound
- *Nanami Bono, Tatsuya Maruta*. Some New 4-dimensional Linear Codes
- *Maya Fujii, Tatsuya Maruta*. Nonexistence of Some Griesmer Codes of Dimension 4 over F_8

July 14, 09:30-11:30 – Panel 8

Chair: Emil Kolev

- *Michael Schelling, Martin Bossert*. Code Constructions Based on Reed-Solomon Codes
- *Iliya Bouyukliev, Paskal Piperkov*. On Walsh Transform and Matrix Factorization
- *Tsonka Baicheva, Miroslav Dimitrov*. Cryptanalysis on Short Messages Encrypted with M-138 Cipher Machine
- *Vincent Rijmen, Liliya Krалеva, Nikolai Manev*. Correlation Distribution Analysis of a Two Round Key-alternating Block Cipher

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July 12, 14:30-16:00 – Panel 5

Chair: Vesko Valov

- Valentin Gutev. Scattered Spaces and Selections
- Themba Dube. When Does Booleanization Commute with Lindelöfication in the Category of Locales?
- Simeon Stefanov. An Invariant Counting the Number of Critical Points

July 12, 16:30-18:00 – Panel 6

Chair: Valentin Gutev

- Nikita Shekhtkovski. Intrinsic Approach to Shape and Applications
- Atanas Hamamjiev, Vladimir Todorov. “Pathological” Cantor Manifolds II
- Dikran Dikranjan. On a Theorem of Prodanov

July 13, 14:30-16:00 – Panel 7

Chair: Themba Dube

- Strashimir Popvassilev, John (Ted) Porter. Monotone Covering Properties
- Stoyu Barov, Jan Dijkstra. A Relation Between Exposed Points and Extremal Points of Convex Sets
- Vesko Valov, Konstantin Kozlov. Spectral Representations of Topological Groups

Registration Desk

July 9	13:00-17:00	IMI-BAS
July 10	08:00-09:00	Sofia Hotel Balkan
July 10	13:00-17:00	IMI-BAS
July 11	13:00-15:00	IMI-BAS
July 12	14:00-15:00	IMI-BAS
July 13	14:00-15:00	IMI-BAS

Social Program

(included in all registration rates)

Welcome party

July 10, 19:30 – 21:00

Archaeological Museum

There is no better place to say “Welcome” than among the unique artefacts of Bulgarian history.

Happy hour

July 12, 18:00 – 19:00

IMI-BAS backyard

Join colleagues for refreshments, conversation, and relaxation as we wind down another productive day.

Sofia Sightseeing Tour

July 13, 17:00 – 19:00

Sofia Historical Center

This is a perfect opportunity to discover the beauty and the interesting history of Sofia. Within approximately two hours walking tour, you will visit the most important sights in the city center.

Official Dinner

July 13, 20:00 – 23:45

Sofia Hotel Balkan

One pleasant meeting with friends and adherents in the solemn atmosphere of the Royal Ballroom Hall of the Sofia Hotel Balkan.

