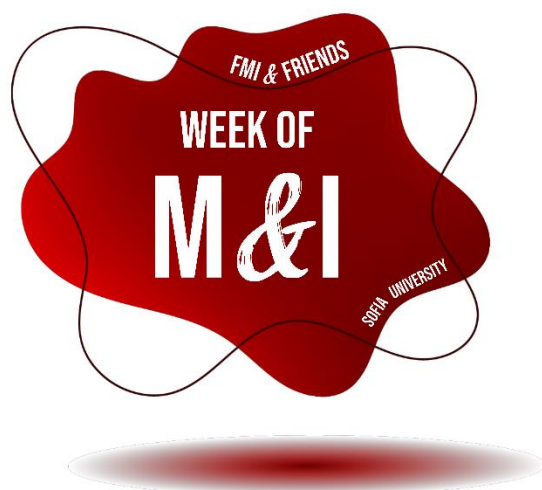


International Conference
Week of Mathematics and Informatics

135 Years
Faculty of Mathematics and Informatics
Sofia University “St. Kliment Ohridski”



PROGRAM

Duni Royal Resort, Bulgaria
September 23-27, 2024

Sunday, September 22
Arrival day

16:00 – 18:00 Registration of participants

Monday, September 23

08:00 – 09:00 Registration of participants

Plenary hall

09:00 – 09:30 Opening

09:30 – 10:00 Invited talk: *135 years Faculty of Mathematics and Informatics: Origins and yearly development*
Tinko Tinchev

Section: Variational Analysis and Applications

Chair: Mikhail Krastanov

10:00 – 10:50 Invited talk: *On second order sufficient condition for a minimum*
Alexander Ioffe

11:00 – 11:30 *Metric slopes*
Nadia Zlateva, Milen Ivanov

11:30 – 12:00 *Dual-based methods for the exponential stabilization of nonlinear dynamical systems*
Sabine Pickenhain

12:00 – 12:30 *A variational condition in optimal control problems*
Mikhail Krastanov, **Nadezhda Ribarska**

12:30 – 14:00 *Lunch*

Hall A

**Section: Challenges of the Digital World Traditions and Innovative Solutions
in Research and Education**

Chair: Mariana Atanassova

14:00 – 14:50 Invited talk: *Generative AI for learning, teaching and research – examples and tools*
Slavi Stoyanov

Parallel sessions:

Hall A

Section: Variational Analysis and Applications

Chair: Vladimir Veliov

- 15:00 – 15:30 *Variational principles for monotone variational inequalities: The multivalued case*
Pando Georgiev
- 15:30 – 16:00 *Differential inclusions and quasi-Lyapunov functions*
Martin Ivanov, Mikhail Krastanov, Nadezhda Ribarska
- 16:00 – 16:30 *Coffee Break*
- 16:30 – 17:00 *A continuous linear-quadratic optimal control problem under external disturbances*
Mikhail Krastanov, **Boyan Stefanov**
- 17:00 – 17:30 *Simultaneous perturbed minimization of a convergent sequence of functions*
Hristina Topalova, Nadia Zlateva
- 17:30 – 18:00 *Transversality and subtransversality of closed convex cones*
Nadezhda Ribarska, **Maria Tasheva**

Hall B

Section: Challenges of the Digital World Traditions and Innovative Solutions in Research and Education

Chair: Mariana Atanassova

- 15:00 – 15:30 *Programming in elementary education in the context of building 21st century competencies*
Georgi Hristov
- 15:30 – 16:00 *Digital learning environment for pre-laboratory activities of the students in chemical education*
Tanya Monova, Oleg Konstantinov, Stefan Tsakovski
- 16:00 – 16:30 *Coffee Break*
- 16:30 – 17:00 *Empathy and teamwork as successful approaches for digital media education*
Oleg Konstantinov
- 17:00 – 17:30 *Online digital resources for mental health literacy and resilience as a priority of the Me_Heli-D project*
Dafinka Miteva, **Elitsa Peltekova**, **Ioannis Patias**
- 17:30 – 18:00 *High school education approach to development of industrial robot that uses Artificial Intelligence*
Ianislav Kartelov, Ivan Shepelev
- 19:30 – 20:30 *Welcome party*

Tuesday, September 24

Parallel sessions

Hall A

Section: Algebra and coding theory

Dedicated to the memory of Kerope Tchakerian (1944 - 2012)

Chair: Maya Stoyanova

09:00 – 09:50 Invited talk: *Optimal polarization (PULB) pairs of codes found in the Leech lattice*
Sergiy Borodachov, Peter Boyvalenkov, **Peter Dragnev**, Douglas Hardin, Edward Saff, Maya Stoyanova

10:00 – 10:30 *A kissing number with forbidden distances*
Peter Boyvalenkov, Danila Cherkashin

10:30 – 11:00 *Theorems of Erdos-Ko-Rado type in ring geometries*
Ivan Landjev, Emiliyan Rogachev, **Assia Rousseva**

11:00 – 11:30 *Coffee break*

Chair: Ivan Landjev

11:30 – 12:00 *Noncommutative alternating polynomials in free associative algebras*
Silvia Boumova, Vesselin Drenski, **Deyan Dzhundrekov**, Martin Kassabov

12:00 – 12:30 *A Diophantine problem with two primes and a square of prime of a special form*
Tatiana Todorova

12:30 – 13:00 *Divisors of codes*
Azniv Kasparian

13:00 – 14:00 *Lunch*

Section: Differential Equations and Applications

Chair: Virginia Kiriakova

14:00 – 14:50 Invited talk: *Pohožaev identities and some applications in nonlinear PDE*
Nedyu Popivanov

15:00 – 15:30 *Fractional differential equations with the general fractional derivatives with the Sonin kernels*
Yuri Luchko

15:30 – 16:00 *Semi-global symplectic invariant of the champagne bottle*
Ognyan Christov

16:00 – 16:30 *Coffee break*

Chair: Nedyu Popivanov

- 16:30 – 17:00 *Analytical properties and examples of the generalized Fox-Wright function*
Jordanka Paneva-Konovska, Virginia Kiriakova
- 17:00 – 17:30 *Multidimensional Protter-Morawetz problems for degenerate hyperbolic equations*
Tsvetan Hristov
- 17:30 – 18:00 *Non-integrability of the Sasano systems*
Tsvetana Stoyanova

Hall B

Section: Information Science and e-Society (UNITE)

Chair: Evgeniy Krastev

- 09:30 – 10:00 *The Centre of excellence Unite in the Knowledge Triangle*
Elissaveta Gourova
- 10:00 – 10:30 *Cross-modal data representation through vectorization: a case study with vector forge*
Simeon Emanuilov, Aleksandar Dimov
- 10:30 – 11:00 *Neural networks for ovary diseases recognition*
Yasmina Osmandzhikova, Sotir Sotirov
- 11:00 – 11:30 *Coffee break*
- 11:30 – 12:00 *Machine learning reveals specific blood microbial profiles in pulmonary sarcoidosis patients*
Maya Zhelyazkova, Y. Hodzhev, B. Tsafarova, V. Tolchkov, N. Yanev, V. Youroukova, S. Ivanova, D. Kostadinov, M. Nacheva-Sokolova, S. Tsonev, S. Panaiotov
- 12:00 – 12:30 *Investigation of the scalability of a parallel system based on the sieve of Eratosthenes*
Dobromir Petrov, **Stanislav Simeonov**
- 12:30 – 13:00 *Advanced models for text summarization: A comparative study*
Maria Nisheva
- 13:00 – 14:00 *Lunch*

Section: Mechatronics and Robotics

Chair: Ivan Chavdarov

- 14:00 – 14:30 *Motion design of an open-chain redundant robot arm using factor group technique*
George Boiadjiev, Ivan Chavdarov, Evgeniy Krastev, Lyubomira Miteva
- 14:30 – 15:00 *Nonlinear regression and sensitivity analysis for continuous approximation of TBP data for crude oils*
Dimitar Nedanovski, Svetoslav Nenov
- 15:00 – 15:30 *Investigation of motion planning algorithms for a mobile robot under incomplete environmental information*
Vasil Ninov, Ivan Chavdarov, Kaloyan Yovchev
- 15:30 – 16:00 *Design and control of 3D printed parallel robot with a delta structure*
Vladislav Hrosinkov, Ivan Chavdarov, Kaloyan Yovchev
- 16:00 – 16:30 *Coffee break*
- 16:30 – 17:00 *Enhancing the education in mathematics and informatics by using ROS (Robot operating system) for interdisciplinary projects*
Simeon Tsvetanov, Albena Antonova
- 17:00 – 17:30 *Dynamical model and control of a simple 3D printed walking robot*
Aleksander Stefanov, Ivan Chavdarov, Dimitar Nedanovski, Kaloyan Yovchev
- 19:30 *Dinner*

Wednesday, September 25

Parallel sessions

Hall A

Section: Numerical Methods and Theory of Approximations

Dedicated to the memory of Borislav Bojanov (1944 – 2009)

Chair: Geno Nikolov

- 09:00 – 09:50 *Invited talk: Some remarks on the B-spline basis condition number*
Alexei Shadrin
- 10:00 – 10:30 *Monotonicity and unimodality of ratios of integral transforms and applications*
Dmitrii Karp, Anna Vishnyakova, Yi Zhang
- 10:30 – 11:00 *Chebyshev B-splines with Birkhoff-type of knots*
Rumen Uluchev
- 11:00 – 11:30 *Coffee break*

Chair: Rumen Uluchev

- 11:30 – 12:00 *On the regularity of some Birkhoff interpolation problems induced by three-row almost Hermitian incidence matrices*
Geno Nikolov, Borislava Konstantinova
- 12:00 – 12:30 *Weighted approximation of functions in L_p -norm by Kantorovich modifications of some classical operators*
Ivan Gadjev
- 13:00 – 14:00 *Lunch*

Section: Variational Analysis and Applications

Chair: Nadya Zlateva

- 14:00 – 14:50 *Invited talk: Frechet versus Gateaux differentiability – Counter-example*
Marián Fabian, Jan Kolář
- 15:00 – 15:30 *An immuno-epidemiological model with dynamic immunity*
Vladimir Veliov
- 15:30 – 16:00 *On the problem of calculus of variations with pure state constraints of equality type*
Mikhail Krastanov
- 16:00 – 16:30 *Coffee break*
- 16:30 – 17:00 *High-order small-time local controllability*
Margarita Nikolova, Mikhail Krastanov
- 17:00 – 17:30 *Fixed Point Theorems in Premetric Spaces*
Milen Ivanov, **Detelina Kamburova**, Nadia Zlateva

Hall B

Section: Differential Equations and Applications

Chair: Tsvetan Hristov

- 09:30 – 10:00 *Differential equations in vertex algebras and deformations*
Nikolay M. Nikolov
- 10:00 – 10:30 *Role of dielectric permittivity on plasma behaviour in surface-wave discharge*
Mariana Atanasova, A. Stefanov, E. Benova, J. J. A. M. van der Mullen
- 10:30 – 11:00 *Meromorphic non-integrability of a Hamiltonian system with a sixth-order homogeneous potential*
Georgi Georgiev, Dessislava Neykova

- 11:00 – 11:30 *Coffee break*
- 11:30 – 12:00 *On the uniqueness of the solutions of some non-local BV problems for second order linear PDE of changing type*
Mariya Karatopraklieva
- 12:00 – 12:30 *Singular solutions to Protter's boundary-value problem for the wave equation*
Todor Popov
- 12:30 – 13:00 *A continuous-time OLG model with human capital - exploring the interplay of qualification and demographic developments*
Andrey Vassilev
- 13:00 – 14:00 *Lunch*

Section: Numerical Methods and Theory of Approximations
Dedicated to the memory of Borislav Bojanov (1944 – 2009)

Chair: Alexei Shadrin

- 14:00 – 14:30 *Fourier quasicrystals, crystalline measures and their generalizations*
Serhii Favorov
- 14:30 – 15:00 *Multiclass approximation and subspace clustering in reproducing kernel Hilbert spaces*
Pando Georgiev
- 15:00 – 15:30 *Instability analysis of a diffusion-reaction PDE model describing immune cell dynamics*
Tihomir Ivanov, **Georgi Bazlyankov**
- 15:30 – 16:00 *Markov interlacing property for generalized polynomials*
Lozko Milev, **Nikola Naidenov**
- 16:00 – 16:30 *On the critical points of oscillating polynomials with Laguerre weight*
Lozko Milev, Nikola Naidenov
- 16:30 – 17:00 *Coffee break*

Section: Probabilities and Statistics

Chair: Pando Georgiev

- 17:00 – 17:30 *Transformations of discrete stable process via branching reproduction of particles*
Maroussia Slavtchova-Bojkova, Penka Mayster
- 17:30 – 18:00 *Modelling longitudinal cognitive test data with ceiling effects and left skewness*
Denitsa Grigorova, Dean Palejev, Ralitzia Gueorguieva
- 18:00 – 18:30 *Generalization of multitype branching processes with immigration generated by point processes*
Martin Minchev, Maroussia Slavtchova-Bojkova

18:30 – 19:00 *Branching processes with random migration*
Tsvetomira Zlatkova, Vessela Stoimenova

Hall C

Section: Challenges of the Digital World Traditions and Innovative Solutions in Research and Education

- 09:00 – 11:00 **Workshop:** *Digital competence in the (Future-Directed) University Curricula for teachers of mathematics and informatics*
Nikolina Nikolova, Olga Firssova, Temenuzhka Zafirova-Malcheva, Borislava Videnova, Russi Kararusinov
- 11:00 – 11:30 *Coffee break*
- 11:30 – 13:00 **Workshop:** *Modern-@ Masters' programs rethinking*
Nikolina Nikolova, Olga Firssova, Temenuzhka Zafirova-Malcheva
- 13:00 – 14:00 *Lunch*
- 14:00 – 14:45 **Workshop:** *Educational storytelling using generative AI & HI*
Trayan Iliev
- 15:00 – 16:00 **Workshop:** *Interactive content creation: A beginner's guide to creating, sharing and reusing digital resources*
Elitsa Peltekova
- 19:30 – 22:00 *Dinner*

Thursday, September 26

Parallel sessions

Hall A

Section: Geometry and Topology

Chair: **Peter Boyvalenkov**

- 09:00 – 09:50 Invited talk: *130+ Years of the Hadamard conjecture*
Ilias Kotsireas
- 10:00 – 10:30 *The Riemannian curvature identities on almost complex Calabi-Yau with torsion 6-manifold and generalized Ricci solitons*
Stefan Ivanov, Nikola Stanchev
- 10:30 – 11:00 *Li-Yau Sub-gradient estimates and Perelman-type entropy formulas for the heat equation in quaternionic contact geometry*
Alexander Petkov
- 11:00 – 11:30 *Coffee break*

Chair: Stefan Ivanov

- 11:30 – 12:00 *Geometry of paraquaternionic contact structures*
Stefan Ivanov, **Marina Tchomakova**, Simeon Zamkovoy
- 12:00 – 12:30 *Nonlocal analogues of the Lidstone polynomials*
Yulian Tsankov
- 12:30 – 13:00 *The Riemannian Bianchi identities of metric connections with skew torsion and generalized Ricci solitons*
Stefan Ivanov, **Nikola Stanchev**
- 13:00 – 14:00 *Lunch*

**Section: Mathematical Logic and its Applications,
Dedicated to the memory of Dimiter Vakarelov (1938 – 2023)**

Chair: Tinko Tinchev

- 14:00 – 14:30 *How to make AI with a good character?*
Dimiter Dobrev
- 14:30 – 15:00 *Geometric constructions without ruler and compass*
Vladimir Sotirov
- 15:00 – 15:30 *Modal logic with bi-implication is exponentially more succinct on BT and S4 models*
Petar Iliev
- 15:30 – 16:00 *New subrecursive degrees of representations of irrational numbers based on Weihrauch intersections and trace functions*
Ivan Georgiev
- 16:00 – 16:30 *Coffee break*

Chair: Ivan Georgiev

- 16:30 – 17:00 *Measurable contact algebras*
Philippe Balbiani, Quentin Gougeon, **Tinko Tinchev**
- 17:00 – 17:30 *Monadic second-order theories of postlinear orders and preorders*
Grigor Kolev, Tinko Tinchev
- 17:30 – 18:20 *Invited talk: Real numbers and their representations*
Lars Kristiansen

Hall B

Section: Challenges of the Digital World - Traditions and Innovative Solutions in Research and Education

Chair: **Nikolina Nikolova**

- 09:00 – 09:30 *Game as a learning, learning as a game*
Trayan Iliev
- 09:30 – 10:00 *Need of problem solving courses*
Ivan Tonov
- 10:00 – 10:30 *Innovation and the Cultural-Historical context in Mathematics education*
Tanya Tonova
- 10:30 – 11:00 *Innovative practical pedagogical tools for CS and IT education*
Yavor Papazov, Stanimira Jelezova
- 11:00 – 11:30 *Coffee break*
- 11:30 – 12:00 *Cyber security concepts in the software development process*
Mariya Harseva, Milen Petrov
- 12:00 – 12:30 *Innovative solutions in mental and educational health: Development of a mobile application for tracking daily activities*
Viktoriya Pepieva, Milen Petrov
- 12:30 – 13:00 *Corporate E-learning based on organizational development vision*
Lilyana Russeva
- 13:00 – 14:00 *Lunch*

Section: Variational Analysis and Applications

Chair: **Marian Fabian**

- 14:00 – 14:30 *Fedorchuk compacta and LUR renormability*
Todor Manev
- 14:30 – 15:00 *Metric embeddings of Laakso graphs into Banach spaces*
Stephen J. Dilworth, Denka Kutzarova, **Svetozar Stankov**
- 15:00 – 15:30 *Lipschitz continuity of the regular graphical derivative*
Stoyan Apostolov
- 15:30 – 16:00 *Continuity of the solutions of parametric optimization problems*
Stoyan Apostolov, **Dimitar Georgiev**
- 20:00 *Official dinner*

Friday, September 27

Departure day

- Up to 11:30 Check out