

Monday, August 20

Lecture Hall A

Plenary Session

09:00–09:15 **Opening**

Chairperson **I. Dimov**

09:15–10:00 **Jean-Claude Latché**

A Class of Staggered Schemes for Euler Equations (.pdf)

10:00–10:45 **Jun Hu**

Adaptive and Multilevel Mixed Finite Element Methods (.pdf)

10:45–11:15 Coffee Break

SS3: Numerical Methods for Fractional Diffusion Problems

Chairperson **R. Lazarov**

11:15–11:50 **Joseph E. Pasciak** (Keynote Lecture)

Numerical Approximation of Fractional Powers of Elliptic Operators

11:50–12:15 S. Harizanov, R. Lazarov, **S. Margenov**, P. Marinov, Y. Vutov

BURA: Robust Solution Methods for Fractional Diffusion Problems

12:15–12:40 **Zhi Zhou**

High-Order Time Stepping Schemes for Fractional Evolution Equations

Monday, August 20

Lecture Hall A

SS3: Numerical Methods for Fractional Diffusion Problems

Chairperson **Zhi Zhou**

- 14:30–14:55 **Yubin Yan**
High Order Fractional Adams Method with Graded Meshes ([.pdf](#))
- 14:55–15:20 **Abdallah Bradji**
A Second Order Time Accurate SUSHI Method for the Time-Fractional Diffusion Equation
- 15:20–15:45 Francisco J. Gaspar, Xiaozhe Hu, **Carmen Rodrigo**
Multigrid with Space-Time Concurrency for Solving the Time-Fractional Heat Equation ([.pdf](#))
- 15:45–16:10 **Petr N. Vabishchevich**
Identification of the Right-Hand Side of an Equation with a Fractional Power of an Elliptic Operator ([.pdf](#))
- 16:10–16:40 Coffee Break

Chairperson **P. Vabishchevich**

- 16:40–17:05 **Stanislav Harizanov**
Positive Approximations of the Inverse of Fractional Powers of SPD M -matrices
- 17:05–17:30 Abdallah Bradji, **Tarek Ghoudi**
Some Convergence Results of a Multidimensional Finite Volume Scheme for a Semilinear Parabolic Equation with a Time Delay
- 17:30–17:55 **Vladimir Vasilyev**
On Approximate Solution of Pseudo-Differential Equations
- 17:55–18:20 B. Duan, **R. D. Lazarov**, J. H. Pasciak
Numerical Approximation of Fractional Powers of Elliptic Operators ([.pdf](#))

Monday, August 20

Lecture Hall B

SS1: Numerical Search and Optimization

Chairperson **S. Fidanova**

- 11:15–11:50 **Kalin Penev** (Keynote Lecture)
Factors for Search Methods Scalability
- 11:50–12:15 **Adis Alihodzic**, Damir Hasic, Elmedin Selmanovic
An Effective Guided Fireworks Algorithm for Solving UCAV Path Planning Problem
- 12:15–12:40 **Paul Bourne**, Neville Palmer, Jan Skrabala
Quantifying the Effectiveness of First-hop Redundancy Protocols in IP Networks
(.pdf)

Chairperson **K. Penev**

- 14:30–14:55 **Stefka Fidanova**, Olympia Roeva
InterCriteria Analysis of Different Variants of ACO Algorithm for Wireless Sensor Network Positioning
- 14:55–15:20 **Georgi Evtimov**, Stefka Fidanova
Subtraction of Two 2D Polygons with Some Matching Vertices
- 15:20–15:45 Vladimir Myasnichenko, Nikolay Sdobnyakov, Leoneed Kirilov, **Rossen Mikhov**, Stefka Fidanova
Monte-Carlo Approach for Optimizing of Metal Nanowires and Nanoalloys Structure (.pdf)
- 15:45–16:10 **Velislava Stoykova**
Statistical Analysis of Conjunctive Adverbs Used in the First Bulgarian School Books in Mathematics (from the First Half of XIX C.)
- 16:10–16:40 Coffee Break

Chairperson **S. Fidanova**

- 16:40–17:05 **Ján Buša**, Miroslav Dovica, Lukáš Kačmár
Identification of a Coordinate System of Three Triangulation Sensors in a Plane
- 17:05–17:30 **Tatiana F. Filippova**
Description of Dynamics of Ellipsoidal Estimates of Reachable Sets of Nonlinear Control Systems with Bilinear Uncertainty (.pdf)
- 17:30–17:55 Ivan D. Gospodinov, **Stefan M. Filipov**, Atanas V. Atanassov
Solving Function Approximation Problems Using the L_2 -Norm of the Log Ratio as a Metric
- 17:55–18:20 **K. G. Kapanova**, I. T. Dimov
Extreme Learning Machines: a Sensitivity Analysis Perspective in the Presence of Random Fluctuations
- 18:20–19:00 Poster Session

Monday, August 20

Lecture Hall B

SS2: Problem-driven Numerical Method: Motivation and Application

Chairperson **Jun Hu**

- 09:00–09:35 **Yunfeng Xiong** (Keynote Lecture)
Efficient Implementation of the Wigner Branching Random Walk Algorithms
- 09:35–10:00 **Huazhong Tang**
2D Special Relativistic Hydrodynamics ([.pdf](#))
- 10:00–10:25 **Guoxian Chen**
An Well Balanced and Positive Preserving Scheme for Euler Equations with Gravity
- 10:25–10:50 Philippe Devloo, Rong-Hong Fan, **Chen-Song Zhang**
A Multiscale Hybrid Mixed Finite Element Method for Discrete Fracture Networks
([.pdf](#))
- 10:45–11:15 Coffee Break

Chairperson **S. Shao**

- 11:15–11:40 **Zhenzhu Chen**, Sihong Shao, Wei Cai
An Accurate Four-Dimensional Wigner Simulator with Applications in Double-Slit Interference
- 11:40–12:05 **Zhaocheng Xuan**
The Statistical Property in Finite Element Model of Elastic Contact Problems ([.pdf](#))
- 12:05–12:30 **Călin-Ioan Gheorghiu**
Spectral Collocation Solutions to a Class of Pseudo-Parabolic Equations ([.pdf](#))
- 12:30–12:55 Johannes Kraus, **Svetoslav Nakov**, Sergey Repin
Guaranteed Bounds on the Error in Energy Norm for the Nonlinear Poisson–Boltzmann Equation

Monday, August 20

Lecture Hall B

Contributed Talks

Chairperson **G. Dimitriu**

- 14:30–15:05 **Wil Schilders** (Keynote Lecture)
Recent Developments in Model Order Reduction (.pdf)
- 15:05–15:30 **Dimitar Slavchev**, Svetozar Margenov
Analysis of Hierarchical Compression Based Solver from STRUMPACK for BEM Problem on Intel Xeon CPUs (.pdf)
- 15:30–15:55 **Tihomir Ivanov**, Galina Lyutskanova–Zhekova, Zdravka Nedyalkova, Vasil Pashov, Maria Zarcheva
Parametric Identification and Post-Processing in Wind Power Forecasting Problems (.pdf)
- 15:55–16:20 **Galina Lyutskanova–Zhekova**, Krassimir Danov
Effect of Ionic Strength on the Electro-Dipping Force (.pdf)
- 16:10–16:40 Coffee Break

Chairperson **W. Schilders**

- 16:40–17:05 **Gabriel Dimitriu**
A Global Sensitivity Analysis for a Chronic Myelogenous Leukemia Model with T Cell Interaction
- 17:05–17:30 **Milen K. Borisov**, Neli S. Dimitrova, Mikhail I. Krastanov
Model-Based Stabilization of a Fermentation Process Using Output Feedback with Discrete Time Delay
- 17:30–17:55 **Maxim Bashashin**, Elena Zemlyanaya, Mikhail Kiselev
Parallel SFF-SANS Study of Structure of Polydispersed Vesicular Systems
- 17:55–18:20 **Mark Houghton**, Mark Walkley, David Head
A Numerical Model For Random Fibre Networks

Tuesday, August 21

Lecture Hall B

SS5: Monte Carlo and Quasi-Monte Carlo Methods

Chairperson **R. Kruse**

- 09:00–09:35 **Stefan Heinrich** (Keynote Lecture)
Complexity Theory for Strong Approximation of Stochastic Problems
- 09:35–10:00 **Monika Eisenmann**, Raphael Kruse
Two Quadrature Rules for Stochastic Itô-Integrals with Fractional Sobolev Regularity
- 10:00–10:25 **David Cohen**
A Fully Discrete Approximation of the One-Dimensional Stochastic Heat Equation
- 10:25–10:50 Michael Griebel, Aicke Hinrichs, Jens Oettershagen, **Mario Ullrich**
Integration of Smooth Functions Using Random Point Sets
- 10:45–11:15 Coffee Break

Chairperson **S. Heinrich**

- 11:15–11:40 **Stefan Geiss**, Thuan Nguyen
Quantitative Discretization of Stochastic Integrals and Fractional Bounded Mean Oscillation
- 11:40–12:05 **Aicke Hinrichs**, David Krieg
How Good Is Random Information? – Approximation in the Hilbert Space Setting
(.pdf)

Tuesday, August 21

Lecture Hall B

SS5: Monte Carlo and Quasi-Monte Carlo Methods

Chairperson **S. Heinrich**

- 14:30–14:55 **Christel Geiss**, Céline Labart, Antti Luoto
Random Walk Approximation of Forward-Backward SDEs and Their Associated PDEs
- 14:55–15:20 **Paweł Przybyłowicz**
Path-(in)dependent Adaptive Step-Size Control for SDEs with Jumps
- 15:20–15:45 Andrzej Kałuża, **Paweł M. Morkisz**, Paweł Przybyłowicz
Analytic Noise Model for Efficient Approximation of Itô Integrals
- 15:45–16:10 Murat Sari, **Hande Uslu**
Monte Carlo Based Stochastic Approach for Some Nonlinear ODE Systems (.pdf)
- 16:10–16:40 Coffee Break

Contributed Talks

Chairperson **T. Ostromski**

- 16:40–17:05 I. Dimov, J. Kandilarov, **V. Todorov**, L. Vulkov
Numerical Analysis of a Pollutant and Environment Interaction Model
- 17:05–17:30 **Hristo Chervenkov**, Kiril Slavov
STARDEX and ETCCDI Climate Indices Based on E-OBS and CARPATCLIM. Part One: General Description (.pdf)
- 17:30–17:55 Hristo Chervenkov, **Kiril Slavov**, Vladimir Ivanov
STARDEX and ETCCDI Climate Indices Based on E-OBS and CARPATCLIM. Part Two: ClimData in Use (.pdf)
- 17:55–18:20 D. Syrakov, E. Georgieva, M. Prodanova, E. Hristova, K. Slavov, **Blagorodka Veleva**
Application of WRF-CMAQ Model System for Analysis of Atmospheric Deposition over Bulgaria (.pdf)

Wednesday, August 22

Lecture Hall A

Plenary Session

Chairperson **S. Margenov**

09:00–09:45 **Francisco J. Gaspar**

Stabilized Finite Element Discretizations for Poroelasticity ([.pdf](#))

09:45–10:30 **Raphael Kruse**

Error Analysis of Randomized Time-Stepping Methods for Non-autonomous Evolution Equations with Time-Irregular Coefficients ([.pdf](#))

Thursday, August 23

Lecture Hall A

SS1: Numerical Search and Optimization

Chairperson **S. Fidanova**

- 09:00–09:25 **Lukas Gnam**, Siegfried Selberherr, Josef Weinbub
Evaluation of Serial and Parallel Shared-Memory Distance-1 Graph Coloring Algorithms
- 09:25–09:50 **Zbigniew Kokosinski**, Marcin Pijanowski
Application of Parallel and Hybrid Metaheuristics for Graph Partitioning Problem ([.pdf](#))
- 09:50–10:15 **Sihong Shao**
Lovász Extension and Graph Cut
- 10:15–10:40 **Nina Dobrinkova**, Momchil Panayotov, Peter Boyvalenkov
Optimisation Techniques in Wildfire Simulations. Test Case Kresna Fire August 2017
- 10:45–11:15 Coffee Break

Chairperson **K. Penev**

- 11:15–11:40 **Velichka Traneva**, Stoyan Tranev, Vassia Atanassova
An Intuitionistic Fuzzy Approach to the Hungarian Algorithm ([.pdf](#))
- 11:40–12:05 Velichka Traneva, **Vassia Atanassova**, Stoyan Tranev
Index Matrices as a Decision-Making Tool for Job Appointment ([.pdf](#))
- 12:05–12:30 **Maria Angelova**, Olympia Roeva, Tania Pencheva
Cuckoo Search Algorithm for Parameter Identification of Fermentation Process Model
- 12:30–12:55 Todor Balabanov, Janeta Sevova, **Kolyu Kolev**
Optimization of String Rewriting Operations for 3D Fractal Generation with Genetic Algorithms ([.pdf](#))

Thursday, August 23

Lecture Hall A

SS4: Orthogonal Polynomials and Numerical Quadratures

Chairperson **M. Petkova**

- 14:30–14:55 **Ana Avdzhieva**, Vesselin Gushev, Geno Nikolov
Definite Quadrature Formulae of Order Three Based on the Rectangles Quadrature Formula
- 14:55–15:20 **Rumen Uluchev**, Geno Nikolov
Bounds for the Extreme Zeros of the Laguerre Polynomials (.pdf)
- 15:20–15:45 **Geno Nikolov**
New Bounds for the Extreme Zeros of Classical Orthogonal Polynomials (.pdf)
- 15:45–16:10 Morten A. Nome, **Tor Sørøvik**
Discrete Fourier Analysis on Lattice Grids (.pdf)
- 16:10–16:40 Coffee Break

Chairperson **G. Nikolov**

- 16:40–17:05 Petko D. Proinov, **Milena D. Petkova**
A New Local Convergence Theorem for a Family of Multi-Point Weierstrass Type Root-Finding Methods (.pdf)
- 17:05–17:30 Petko D. Proinov, **Maria T. Vasileva**
Local Convergence of a Family of Gargantini–Farmer–Loizou Type Iterative Methods for Simultaneous Approximation of Multiple Polynomial Zeros (.pdf)
- 17:30–17:55 **Slav I. Cholakov**
Wang–Zheng’s Method for Simultaneous Finding Polynomial Zeros (.pdf)
- 17:55–18:20 E. Ayriyan, **M. D. Malykh**, L. A. Sevastianov, Yu Ying
Finite Difference Schemes and Classical Transcendent Functions (.pdf)

Thursday, August 23

Lecture Hall B

Contributed Talks

Chairperson **T. Chernogorova**

- 09:00–09:25 **V. Vucheva**, N. Kolkovska
Symplectic Algorithms for Boussinesq Equation
- 09:25–09:50 **S. Chandra Sekhara Rao**, Varsha Srivastava
Alternate Overlapping Schwarz Method for Singularly Perturbed Semilinear Convection-Diffusion Problems (.pdf)
- 09:50–10:15 **Juri Kandilarov**, Luben Vulkov
Front Fixing Finite Difference Method for Pricing a Corporate Bond with Credit Rating Migration
- 10:15–10:40 **Miglena N. Koleva**, Lubin G. Vulkov
Positivity Preserving Numerical Method for Optimal Portfolio in a Power Utility Two-Dimensional Regime-Switching Model
- 10:45–11:15 Coffee Break

Chairperson **M. Koleva**

- 11:15–11:40 **Aušra Gadeikytė**, Rimantas Barauskas
Computer Simulation of Heat Exchange through 3D Fabric Layer (.pdf)
- 11:40–12:05 D. V. Divakov, M. D. Malykh, **L. A. Sevastianov**, A. A. Tiutiunnik
On the Calculation of Electromagnetic Fields in Closed Waveguides with Inhomogeneous Filling
- 12:05–12:30 **Daniela Georgieva**, Lubomir Kovachev
Mathematical Modeling of Nonlinear Polarization Rotation and THz Generation of Femtosecond Laser Pulses in Isotropic Media
- 12:30–12:55 B. Batgerel, I. V. Puzynin, T. P. Puzynina, **Z. K. Tukhliev**, I. G. Hristov, R. D. Hristova, Z. A. Sharipov
Molecular-Dynamic Modeling of Long-Range Effect in Metals Exposed to Nanoclusters

Thursday, August 23

Lecture Hall B

SS5: Monte Carlo and Quasi-Monte Carlo Methods

Chairperson **A. Asenov**

- 14:30–14:55 **Stig Larsson**
On the Convergence of Numerical Approximations of the Stochastic Cahn–Hilliard Equation
- 14:55–15:20 **David Krieg**, Daniel Rudolf
Recovery Algorithms for High-Dimensional Rank One Tensors (.pdf)
- 15:20–15:45 **Tzvetan Ostromsky**, Ivan Dimov, Venelin Todorov, Zahari Zlatev
Sensitivity Analysis of an Air Pollution Model by Using Quasi-Monte Carlo Algorithms for Multidimensional Numerical Integration
- 16:10–16:40 Coffee Break

Chairperson **M. Nedjalkov**

- 16:40–17:15 C. Medina-Bailon, T. Sadi, C. Sampedro, J. L. Padilla, L. Donetti, V. Georgiev, F. Gamiz, **A. Asenov** (Keynote Lecture)
Impact of the Trap Attributes on the Gate Leakage Mechanisms in a 2D MS-EMC Nanodevice Simulator
- 17:15–17:40 **Majid Benam**, Mihail Nedjalkov, Siegfried Selberherr
A Wigner Potential Decomposition in the Signed-Particle Monte Carlo Approach (.pdf)
- 17:40–18:05 **Toufik Sadi**, Asen Asenov
Microscopic KMC Modelling of Oxide RRAMs

Friday, August 24

Lecture Hall B

Contributed Talks

Chairperson **L. A. Sevastianov**

- 09:00–09:25 Agnieszka Bielińska, Mikołaj Majkowicz, **Dorota Bielińska-Wąż**, Piotr Wąż
Interdisciplinary Aspects of the Classification Studies
- 09:25–09:50 Agnieszka Bielińska, Mikołaj Majkowicz, **Piotr Wąż**, Dorota Bielińska-Wąż
Similarity Studies in Different Areas of Science
- 09:50–10:15 **Andrius Vytautas Misiukas Misiūnas**, Tadas Meškauskas, Rūta Samaitienė
*Accuracy of Different Machine Learning Type Methodologies for EEG Classification
by Diagnosis* ([.pdf](#))
- 10:45–11:00 **Closing**

Friday, August 24

Lecture Hall C

Contributed Talks

Chairperson **M. Malykh**

- 09:00–09:25 P. Kh. Atanasova, **S. A. Panayotova**, Yu. M. Shukrinov, I. R. Rahmonov, E. V. Zemlyanaya
Numerical Simulation of the Stiff System of Equations within the Spintronic Model
- 09:25–09:50 Asuman Zeytinoglu, **Murat Sari**
Some Difference Algorithms for Nonlinear Klein–Gordon Equations
- 09:50–10:15 **Asuman Zeytinoglu**, Murat Sari
New Algorithms for the Sine–Gordon Equation