



SCIENTIFIC PROGRAM

**New Trends in the Applications of Differential Equations in
Sciences (NTADES'22)**

14-17 June, 2022, Sozopol

Bulgaria

siam.

Tuesday, June 14th

09:00–9:30 **REGISTRATION AND OPENING**

9:30-13:00 **SESSION 1: APPLICATIONS IN MATHEMATICAL PHYSICS**

9:30-10:30 *Invited Plenary Talk*
Stoycho Yazadjiev, *New fully nonlinear dynamical mechanism for formation of scalarized black holes*

10:30 – 11:00 **Coffee Break**

11:00 – 11:30 Nikolay Vitanov, *Simple Equations Method (SEsM): Areas of Possible Applications*

11:30 – 12:00 Zlatinka Dimitrova, *An Example for Application of the Simple Equations Method for the Case of Use of a Single Simple Equation*

12:00 – 12:30 Tzanko Donchev, Dimitar Kolev, Mihail Kolev, Alina Lazu, *Parabolic equations with casual operators*

12:30- 13:00 Yoshihiro Mochimaru, *Search of complex transcendental roots of combination of a nonlinear equation and a polynomial*

13:00 – 14:00 **Lunch Break**

14:00-16:30 **SESSION 2: APPLICATIONS IN NEUROSCIENCES**

14:00 – 15:00 *Invited Plenary Talk*
Alon Ascoli, *A Circuit- and System-Theoretic Exploration of the Potential of Memristors with Negative Differential Resistance*

Effects for the Design of Bio-Inspired Computing Networks

- 15:00 – 15:30 **Coffee Break**
- 15:30 – 16:00 Anastasia Butorova, Alexander Buevich, Andrey Shichkin, Alexander Sergeev, Elena Baglaeva, Marina Sergeeva, Irina Subbotina, Julian Vasilev, *Prediction of the time series by the various types of artificial neural networks by the example of different time intervals of the content of methane in the atmosphere*
- 16:00 – 16:30 Anastasia Butorova, Elena Baglaeva, Irina Subbotina, Marina Sergeeva, Alexander Sergeev, Andrey Shichkin, Alexander Buevich, Pavel Petrov, *Application of the wavelet data transformation for the time series forecasting by the artificial neural network*
- 16:30- 18:30 **SESSION 3: PROFESSOR TODOR GENCHEV- 90 ANNIVERSARY**
- 16:30 – 17:00 Nedyu Popivanov, *Memories of Professor Todor Genchev*
- 17:00 – 17:30 Petar Popivanov, *Some results of Professor Todor Genchev*
- 17:30 - 18:00 Nikolaj Kutev, Tsviatko Rangelov, *Null non-controllability for singular and degenerate heat equation with double singular potential*
- 18:00 – 18:30 Nikolaj Kutev, Milena Dimova, Natalia Kolkovska, *Global Behavior of the Solutions to Nonlinear Wave Equation with Sign-changing Nonlinearity*
- 19:00 **Welcome party**

Wednesday, June 15th

9:00-10:00 **SESSION 4**

9:00 – 10:00 *Invited Plenary Talk*
Li Ma, *Sigma-Porous media flow and Yamabe flow*

10:00 – 10:30 ***Coffee Break***

10:30-13:00 **SESSION 5: APPLICATIONS IN MATHEMATICAL BIOLOGY**

10:30 – 11:00 Atanas Atanasov, Slavi Georgiev, *Parameter Recovery Study of Honeybee Colony Failure due to Nutritional Issues*

11:00 – 11:30 Elena Nikolova, *Dynamical Modeling of Competition between Three Basic Power Plants Types*

11:30 – 12:00 Anna Coletti, *On Jansen-Rit System Modeling Epilepsy Phenomena*

12:00 – 12:30 Laura Manca, E.L. Santarcangelo, E. Bonanni, L. Sebastiani, G. Siciliano, V. Georgiev, *Hypnotizability-related Differences in the Bach's Music Processing, based on the Analysis of Electroencephalographic Signal*

12:30 – 13:00 Iordanka Panayotova, Maila Brucal-Hallare, *Oncolytic virus vs cancer: Modeling and Simulation of Virotherapy with Differential Equations*

13:00 – 14:00 ***Lunch Break***

14:00 – 16:00 **SESSION 6: APPLICATIONS IN NEUROSCIENCE**

14:00-14:30 Maya Markova, *Credit Card Fraud Detection using Long Short-Term Memory Network Model*

14:30-15:00 Venelin Todorov, Ivan Dimov, Rayna Georgieva, *Advanced biased stochastic approaches based on modified Sobol sequences for Fredholm integral equations*

15:00 – 16:00 *Invited Plenary Talk*
Ronald Tetzlaff, *Bio-Inspired Locally-Active Memristor Circuit Analysis and Design*

16:00 – 16:30 ***Coffee Break***

16:30-18:00 **SESSION 7: PRESENTATION OF CENTER OF EXCELLENCE**

16:30-17:00 Angela Slavova, *Presentation of Center of Excellence Informatics, Information and Communication Technologies*

17:00- 17:30 Tsviatko Rangelov, Petia Dineva, *Green 's function and wave scattering for inhomogeneous anti-plane PEM half-plane*

17:30 – 18:00 Nikolaj Kutev, Sonia Tabakova, *A note on the steady Poiseuille flow of Carreau-Yasuda fluid*

18:00 – 19:30 **SESSION 8: APPLICATIONS IN FINANCIAL MATHEMATICS**

18:00 – 18:30 Vilislav Boutchaktchiev, Ivan Jordanov, *Models for Measuring and Forecasting the Inferred Rate of Default*

18:30 – 19:00 Maya Markova, *Forex Time Series Forecasting using Hybrid Convolutional Neural Network/Long Short-Term Memory Network Model*

19:00 – 19:30 Ivan Georgiev, Victoria Deninska, Vesela Mihova, Velizar Pavlov, *Diversification and Optimization of the Financial Portfolio in Times of Uncertainty*

Thursday, June 16th

9:00-10:00 **SESSION 9**

Invited Plenary Talk

Vladimir Georgiev, *Chern-Simons-Schrödinger Equations in Mass Supercritical Case*

10:00 – 10:30 ***Coffee Break***

10:30-13:00 **SESSION 10: APPLICATIONS IN FRACTIONAL ANALYSIS**

10:30 – 11:00 Snezhana Hristova, *Conditional boundedness of generalized proportional Caputo fractional differential equations*

11:00-11:30 Tzanko, Donchev, Snezhana Hristova, *Practical stability of generalized proportional Caputo fractional differential equations by Lyapunov functions*

11:30-12:00 Tzanko Donchev, Nikolay Kitanov, Alina I. Lazu, Stanislav Stefanov, *Nonlinear evolution inclusions with causal operators*

12:00-12:30 Teodora Zapryanova, *Non-positivity of Operators $G_{s,n}^+$*

12:30 – 13:00 Maria Vasileva, Nikolay Kyurkchiev, *Some notes on Arcsine Exponentiated- X Family*

13:00 – 14:00 ***Lunch Break***

14:00- 15:00 **SESSION 11: APPLICATIONS IN NEUROSCIENCE**

14:00-14:30 Snezhana Hristova, Kremena Stefanova, *Discrete neural networks with maximum and non-instantaneous impulses with computer simulation*

14:30- 15:00 Venelin Todorov, Slavi Georgiev, *Highly accurate scrambled stochastic approaches for multidimensional sensitivity analysis in air pollution modeling*

15:00 – 15:30 **Coffee Break**

15:30-17:30 **SESSION 12: APPLICATIONS IN MATHEMATICAL PHYSICS**

15:30-16:00 Nikolaj Vitanov, *Special Functions and Polynomials connected to the Simple Equations Method (SEsM)*

16:00-16:30 Zlatinka Dimitrova, *An Example for Application of the Simple Equations Method for the Case of Use of a Two Simple Equations*

16:30-17:00 Mirko Tarulli, Elena Nikolova, George Venkov, *On the Well-Posedness the Complex Ginzburg-Landau Equation on the Product Manifold $\mathbb{R}^d \times T$*

17:00 – 17:30 Elena Nikolova, Mila Chilikova – Lubomirova, *Exact Traveling Wave Solutions of the Generalized Rosenau–Kawahara-RLW Equation Arising in Fluid Mechanics*

19:00 **Official Dinner**

Friday, June 17th

9:00-10:00 **SESSION 13: APPLICATIONS IN MATHEMATICAL BIOLOGY**

9:00 – 9:30 Irina Volinsky, *Stability Analysis of a Mathematical Model of Hepatitis B Virus with Control on Immune System*

9:30 – 10:00 Atanas Atanasov, Miglena Koleva, Lubin Vulkov, *Numerical Analysis of Honey Bee Colonies in Winter by Sign-changing Chemotactic Coefficient Model*

10:00 – 10:30 **Coffee Break**

10:30 – 13:00 **SESSION 14: APPLICATIONS IN MATHEMATICAL PHYSICS**

10:30 – 11:00 Nazli Irkil, Erhan Piskin, *Well Posedness of Solutions for a Degenerate Viscoelastic Equation for Kirchhoff-type with Logarithmic Nonlinearity*

11:00 – 11:30 Gaukhar Shaikhova, Araylym Syzdykova, Ratbay Myrzakulov, *Analytical solutions for the two dimensional nonlinear equations reduced from the AKNS hierarchy*

11:30 – 12:00 Nazli Irkil, *Global nonexistence result of solutions for a riser equation with logarithmic source term and damping*

12:00 – 12:30 Petar Popivanov, *Boundary Value Problems for the Polyharmonic Operators*

12:30 – 13:00 Sergey Popov, *A boundary value problem for forward-backward parabolic equations*

13:00 – 14:00 **Lunch Break**

14:00 – 16:00 **SESSION 15: APPLICATIONS IN FINANCIAL MATHEMATICS**

14:00 – 14:30 Elitsa Raeva, Velizar Pavlov, *Comparison of the Growth Between the Number and the Payments of IBNR Claims with Chain Ladder Method*

14:30 – 15:00 Vesela Mihova, Virginia Centeno, Ivan Georgiev, Velizar Pavlov, *Comparative Analysis of ARIMA and Modified Differential Equation Approaches in Stock Price Prediction and Portfolio Formation*

15:00 – 15:30 Teodora Klimenko, Velizar Pavlov, *Simulating Stochastic Differential Equations in Option Pricing*

15:30 – 16:00 Iliana Raeva, Ivan Georgiev, *Multicriteria Optimization Approach for Investment Project Financing Evaluation and Decision Making*

16:00 – 18:00 **SESSION 16: APPLICATIONS IN NEUROSCIENCE**

16:00 – 16:30 Atanaska Georgieva, *Applications of Sawi Decomposition Method for Solving Nonlinear Volterra Fuzzy Integral Equations*

16:30 – 17:00 Atanaska Georgieva, Iva Naydenova, *Double Natural Transform to Solve Volterra Fuzzy Integral Equations*

17:00 – 17:30 Atanaska Georgieva, Mira Spasova, *On Solution of Convolution Type Volterra Fuzzy Integro-Differential equations*

17:30 – 18:00 Vesselin Kyurkchiev, Anton Iliev, Asen Rahnev and Nikolay Kyurkchiev, *On a piecewise smooth Gompertz growth function. Applications*

18:00 ***Closing Ceremony***