



## **Scientific Program**

# **New Trends in the Applications of Differential Equations in Sciences (NTADES'20)**

**1-4 September, 2020, St. Constantine and Helena  
Bulgaria**



Financial Support by the Project KP-06-MNF/1

## Tuesday, September 1<sup>st</sup>

16:00–16:30 **Registration**

16:30 – 16:45 **OPENING**

17:00-18:00 **SESSION 1**

17:00 – 18:00 *Invited Plenary Talk*  
Petar Popivanov, *Microlocal nonsolvability and nonhypoellipticity of linear PDO*

18:30 **Welcome party**

## Wednesday, September 2<sup>nd</sup>

10:00-11:00 **SESSION 2**

10:00 – 11:00 *Invited Plenary Talk*  
Elena Litsyn, *Stabilizing Control of a Hysteresis Cellular Nonlinear Network Model*

11:00 – 11:30 **Coffee Break**

11:30-12:30 **SESSION 3 Applications in Neuroscience**

11:30 – 12:00 Valery Covachev, Zlatinka Covacheva, *Existence of periodic solutions for a modified Elman neural network*

12:00 – 12:30 Angela Slavova, *Edge of chaos in polynomial predator-prey CNN Model*

- 12:30 – 14:00      **Lunch Break**
- 14:00-15:00      **SESSION 4 Nonlinear PDEs**
- 14:00 – 14:30      Zlatinka Dimitrova, Nikolay Vitanov, *Simple Equations Method (SEsM) and some of its particular cases*
- 14:30 – 15:00      Nikolay Vitanov, *Simple Equations Method (SEsM): relation to Hirota's method and to IST method*
- 15:00 – 15:30      **Coffee Break**
- 15:30-18:00      **SESSION 5: Applications in Financial Mathematics**
- 15:30 – 16:00      Elena Nikolova, Denislav Serbezov, Nikolay Vitanov, *Chaos in a generalized system for modeling dynamics of three competing economic sectors*
- 16:00- 16:30      Pavel Stoynov, *Lévy processes for financial modelling*
- 17:30-18:00      Pavel Stoynov, *Some computational methods in finance*

### **Thursday, September 3<sup>rd</sup>**

- 9:00-10:00      **SESSION 6**
- 9:00 – 10:00      *Invited Plenary Talk*  
Vladimir Georgiev, *Ground states for Beris - Edward model of liquid crystals*
- 10:00 – 10:30      **Coffee Break**
- 10:30- 12:00      **SESSION 7: Applications of Nonlinear PDEs**
- 10:30 – 11:00      Ivan Jordanov, Nikolay Vitanov, Elena Nikolova, *Nonlinear travelling waves in a generalized model of interacting high density populations*
- 11:00 – 11:30      Elena Nikolova, Mila Chilikova - Lubomirova, Nikolay Vitanov,

- 11:30- 12:00      *Exact solutions of a generalized Sawada-Kotera equation modeling nonlinear long waves in several natural phenomena*  
Aleksander Stefanov, Ivan Chavdarov, Dimitar Nedanovski,  
*Detailed dynamical model of a simple 3D printed walking Robot*
- 12:00 – 14:00      **Lunch Break**
- 14:00 – 15:30      **SESSION 8: Applications in Neurosience**
- 14:00 – 14:30      Atanaska Georgieva, Iva Naydenova, *Adomian decomposition method and homotopy perturbation method in solving two-dimensional Volterra-Fredholm fuzzy integral equations*
- 14:30 – 15:00      Atanaska Georgieva, Mira Spasova, *Solving partial fuzzy integro-differential equations using fuzzy Sumudu transform method*
- 15:00-15:30      D. Ditchev, Z. Petrova, *On the simultaneous teaching of Mathematics and new programming language in master degree*
- 15:30 – 16:00      **Coffee Break**
- 16:00- 18:00      **SESSION 9 Applications in Mechanics**
- 16:00 – 16:30      Tsviatko Rangelov, Petia Dineva, *Dynamic fracture of two nano-cracks in graded elastic half-plane*
- 16:30- 17:0      Yoshihiro Mochimaru, *Estimation of wood check*
- 17:00-17:30      Nikolai Kutev, Tsviatko Rangelov, *Sharp Hardy inequalities in an exterior of a ball*
- 17:30-18:00      Tsvetelina Ivanova, Nikolay Vitanov, *Analysis of the dynamics of substances in nodes of a channel of a network*
- 19:00                      **Official Dinner**

**Friday, September 4<sup>th</sup>**  
**(online presentations)**

- 9:00-11:00     **SESSION 10: Applications in Financial Mathematics**
- 9:00 – 9:30     Vyara Kostadinova, Ivan Georgiev, Vesela Mihova, Velizar Pavlov, *An Application of Markov Chains in Stock Price Prediction and Risk Portfolio Optimization*
- 9:30 – 10:00    Simona Georgieva, Velizar Pavlov, *Claim Reserving Estimation by Using the Chain Ladder Method*
- 10:00 – 10:30   Ivan Georgiev, Evelina Veleva, Emilia Pancheva, *The Influence of Social Distancing on The Change of Economic Losses*
- 10:30- 11:00    Maya Markova, *Credit Card Approval Model: An Application Of Deep Neural Networks*
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- 11:00 – 13:00    **SESSION 11: Applications in Fractional Analysis**
- 11:00 – 11:30    S. Hristova, T. Donchev, A. Georgieva, *Finite time stability of systems of Riemann-Liouville fractional differential equations with a constant delay*
- 11:30- 12:00    Snezhana Hristova, Cemil Tunc, *On the stability properties of retarded Volterra integro-fractional differential equations with Caputo derivative*
- 12:00-12:30     Snezhana Hristova, Antonia Dobрева, Krasimira Ivanova, *Practical stability of differential equations with supremum and non-instantaneous impulses*
- 12:30- 13:00    Tzanko Donchev, *Semilinear Riemann-Liouville evolution inclusions with causal operators*
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- 13:00- 14:30     **SESSION 12: Applications in Mathematical Biology**
- 13:00- 13:30     Nikolay Kyurkchiev, Anton Iliev, Asen Rahnev, Todorka Terzieva, *On the Extended Half-Logistic model by H. Bakouch with "polynomial variable transfer". Application to approximate the specific "Data BG COVID-19"*
- 13:30-14:00     Anna Malinova, Olga Rahneva, Nikolay Pavlov, Angel Golev, Vesselin Kyurkchiev, *A look at the Garima cumulative distribution function and related c.d.f.*
- 14:00-14:30     Antonia Dobрева, *Finite Time Stability for Neural Networks with Supremum*

14:30- 18:30 **SESSION 14: Applications in Mathematical Physics**

14:30- 15:00 V. Vucheva, N. Kolkovska, *High Order Symplectic Finite Difference*

*Scheme for Double Dispersion Equation*

15:00 – 15:30 Kulikov A., Kulikov D., *Global attractor of periodic boundary value*

*problem of the nonlocal Ginzburg-Landau equation*

15:30-16:00 Daniele Barbera, Vladimir Georgiev, *Least energy solutions for a model of liquid crystals*

16:00-16:30 Velizara Pencheva, Ivan Georgiev, Asen Asenov, *Empirical evaluation of passenger waiting time in public transport by using the*

*Monte Carlo method sectors*

16:30- 17:00 Sedef Karakilic, Setenay Akduman, *On the eigenvalues of a polyharmonic matrix operator near diffraction planes*

17:00 – 17:30 Sevdalin Tsvetanov, Daniela Marinova, *Finding the k Shortest Paths*

17:30-18:00 Sevdalin Tsvetanov, Daniela Marinova, *Applications of k shortest paths algorithm in vision recognition*

18:00- 18:30 Mirko Tarulli, *Local and global space-time integrability for the inhomogeneous heat equation*