MASTER PROGRAM

for

EIGHTH INTERNATIONAL CONFERENCE
APPLICATION OF MATHEMATICS IN TECHNICAL AND NATURAL SCIENCES
ALBENA, JUNE 22-27, 2016

TUESDAY, JUNE 21, 2016

17:00-19:00        REGISTRATION
                    Flamingo Grand Hotel – 3rd floor
WEDNESDAY, JUNE 22, 2016

07:30-08:30  REGISTRATION
             Flamingo Grand Hotel – 3rd floor

08:30-09:00  OPENING (Flamingo Grand Hall)

09:00-10:00  PLENARY LECTURE: Edward Kansa
            Title: *Radial Basis Functions: Accomplishments and Challenges*
            (Flamingo Grand Hall)
            Chair: Michail Todorov

10:00-10:30  COFFEE BREAK

Parallel Session APPLIED ANALYSIS
             (Flamingo Grand Hall)
             Chair: Edward Kansa

10:30-11:00  Speaker: Predrag Rajkovic
            Title: *On Analogs of Number π in q-Calculus*

11:00-11:30  Speaker: Murat Sadiku
            Title: *Applying Transformations for Accelerating the Convergence of Trigonometric Series*

11:30-12:00  Speaker: Bianca-Renata Satco/Gabriel Dimitriu
            Title: *Urysohn Measure Driven Integral Equations in the Space of Bounded Variation Functions*

Parallel Session SCIENTIFIC COMPUTING
             (Flamingo Grand Jaco Hall)
             Chair: Nevena Ilieva

10:30-11:00  Speaker: Brenton LeMesurier
            Title: *PDE Models for Pulses in Binary Wave Guide Arrays*
11:00-11:30  Speaker: Denitca Grigorova  
Title: *EMcorrProbit R Package*  

11:30-12:00  Speaker: Elena Lilkova  
Title: *Metadynamics Studies of Large Proteins*  

12:00-14:00  LUNCH  

14:00-15:00  Parallel Session MATHEMATICAL PHYSICS AND TRANSPORT PROCESSES  
(Flamingo Grand Hall)  
Chair: Alexandre Fedoseyev  

14:00-14:30  Speaker: Constance Schober  
Title: *JONSWAP Rogue Waves Over Non-Constant Backgrounds*  

14:30-15:00  Speaker: Alexei Taiursky  
Title: *Spatial Nonlinear Absorption of Alfven Waves by the Dissipative Plasma*  

15:00-16:00  Parallel Session APPLIED ANALYSIS  
(Flamingo Grand Hall)  
Chair: Alexandre Fedoseyev  

15:00-15:30  Speaker: Iliya Bluskov  
Title: *Finding Discrete Structures via Problem Dependent Optimization Data*  

15:30-16:00  Speaker: Ozer Ozen  
Title: *A Note On Fundamental Units in Some Type of Real Quadratic Fields*  

14:00-16:00  Parallel Session SCIENTIFIC COMPUTING  
(Flamingo Grand Jaco Hall)  
Chair: Brenton LeMesurier
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<tr>
<th>Time</th>
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<th>Chair</th>
<th>Speaker</th>
<th>Title</th>
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<tr>
<td>14:00-14:30</td>
<td>Numerical Solution of the Thermal Influence of Oil Well Cluster on Permafrost</td>
<td></td>
<td>Nadezhda Afanasyeva</td>
<td>Speaker: Nadezhda Afanasyeva Title: Numerical Solution of the Thermal Influence of Oil Well Cluster on Permafrost</td>
</tr>
<tr>
<td>14:30-15:00</td>
<td>Measurement of Similarity Users and Items by Feedbacks and Tags for Recommendation System</td>
<td></td>
<td>Kateryna Nesvit</td>
<td>Speaker: Kateryna Nesvit Title: Measurement of Similarity Users and Items by Feedbacks and Tags for Recommendation System</td>
</tr>
<tr>
<td>15:00-15:30</td>
<td>Are There Folding Pathways in the Functional Stages of Intrinsically Disordered Proteins?</td>
<td></td>
<td>Nevena Ilieva</td>
<td>Speaker: Nevena Ilieva Title: Are There Folding Pathways in the Functional Stages of Intrinsically Disordered Proteins?</td>
</tr>
<tr>
<td>15:30-16:00</td>
<td>Numerical Models of Ion-acoustic Collisionless Shock</td>
<td></td>
<td>Konstantinos Liolios</td>
<td>Speaker: Konstantinos Liolios Title: Numerical Models of Ion-acoustic Collisionless Shock</td>
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<td>16:00-16:30</td>
<td>COFEE BREAK</td>
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<td>16:30-18:00</td>
<td>Scientific Computing</td>
<td>Ivanka Zheleva</td>
<td>Ozer Ozen</td>
<td>Speaker: Ozer Ozen Title: Common Fixed Point Theorems in C*-Algebra Valued b-Metric Spaces</td>
</tr>
<tr>
<td>16:30-17:00</td>
<td>Scientific Computing</td>
<td></td>
<td>Maya Stoimenova</td>
<td>Speaker: Maya Stoimenova Title: Stochastic Univariate and Multivariate Time Series Analysis of PM2.5 and PM10 Air Pollution: a Comparative Case Study for Plovdiv and Asenovgrad, Bulgaria</td>
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<tr>
<td>17:00-17:30</td>
<td>Scientific Computing</td>
<td></td>
<td>Ilmars Iltins -cancelled</td>
<td>Speaker: Ilmars Iltins -cancelled Title: Hydrodynamic Instability of a Convective Flow in an Annulus Generated by Heat Sources in a Chemically Reacting Fluid</td>
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<td>17:30-18:00</td>
<td>Scientific Computing</td>
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<td>16:30-18:00</td>
<td>Scientific Computing</td>
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<td>Parallel Session SCIENTIFIC COMPUTING (Flamingo Grand Hall)</td>
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</tbody>
</table>
Chair: Vasily Vasilyev

16:30-17:00  Speaker: Petr Sivtsev
Title: *The Numerical Solving of the Navier-Stokes Equations for Real Gas*

17:00-17:30  Speaker: Stanislav Harizanov
Title: *Hybrid Segmentation of 3D CT Data, Incorporating Various Physical Characteristics of the Scanned Object*

17:30-18:00  Speaker: Vladimir Vinnikov - cancelled
Title: *Numerical Simulation of Meteoroid Dark Flight Trajectory*

20:00  WELCOME PARTY – Bailando Bar
THURSDAY, JUNE 23, 2016

08:30-09:30  PLENARY LECTURE: Alexander Kurganov
Title: Central Schemes: A Powerful Black-Box Solver for Nonlinear Hyperbolic PDEs
(Flamingo Grand Hall)
Chair: Michail Todorov

09:30-10:00 COFFEE BREAK

10:00-10:30  Speaker: Victor Lyashenko
Title: Semi-rigidity vs. Flexibility in Collective Variables Preselection for Mathematical Models of Thermal Processes in the Spherical Area

10:30-11:00  Speaker: Andrii Safonyk
Title: Mathematical Modeling of Wastewater Treatment from Multicomponent Pollution by Using Microporous Particles

11:00-11:30  Speaker: Igor Astionenko
Title: Hierarchy of Bases for Serendipity Finite Element with the Biquadratic Interpolation

11:30-12:00  Speaker: Oksana Voloshina
Title: Risks Assessment Concept as a Factor for Managerial or Investment Decisions

10:00-12:00  Parallel Session BIOMATHEMATICS
(Flamingo Grand Jaco Hall)
Chair: Alexander Kurganov

10:00-10:30  Speaker: Gabriel Dimitriu
Title: Numerical Approach of an Optimal Control Problem for a Diffusive Ecosystem with Two Competing Preys and One Predator

10:30-11:00 Speaker: Dorota Bielinska-Waz
Title: A New Alignment-Free Method of Comparison of DNA Sequences

11:00-11:30 Speaker: Piotr Waz
Title: A New Method in Graphical Bioinformatics

11:30-12:00 Speaker: Evdokia Slepukhina
Title: Noise-Induced Bursting in Rulkov Model

12:00-14:00 LUNCH

Flamingo Grand Hall
Chair: Michail Todorov

14:00-14:45 KEYNOTE LECTURE: Petr Vabishchevich
Title: Numerical Simulation of the Stress-Strain State of the Dental System

14:45-15:30 KEYNOTE LECTURE: Vladimir Shaydurov
Title: The Numerical Solving of the Navier-Stokes Equations for Real Gas

On-line Special Session OSTROGRADSKY-215
(Flamingo Grand Hall)
Chair: Tetiana Hryhorova

15:30-16:00 Speaker: Irina Hvozdeva
Title: The Solution of the Volterra Integral Equations of the Second Kind and Their Discrete Analogues on the Basis of Equation Linking the Kernel and the Resolvent

Parallel Session BIOMATHEMATICS
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<th>Time</th>
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<tr>
<td>15:30-16:00</td>
<td>Speaker: Mikhail Antonov</td>
<td>Title: Molecular Dynamics Simulation of the Structure and Dynamics of 5-HT3 Serotonin Receptor</td>
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<tr>
<td>16:00-16:30</td>
<td><strong>COFEE BREAK</strong></td>
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<tr>
<td>16:30-18:00</td>
<td>On-line Special Session OSTROGRADSKY-215</td>
<td>(Flamingo Grand Hall) Chair: Tetiana Hryhorova</td>
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<tr>
<td>16:30-17:00</td>
<td>Speaker: Elena Kobilskaya</td>
<td>Title: Methods for Solving Inverse Nonlocal Problems for Parabolic Equations</td>
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<td>17:00-17:30</td>
<td>Speaker: Victor Olevsky</td>
<td>Title: Analytic Approximation of Periodic Ateb Functions via Elementary Functions in Nonlinear Dynamics</td>
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<tr>
<td>17:30-18:00</td>
<td>Speaker: Yuliia Olevska</td>
<td>Title: Mathematical Models of Magnetite Desliming for Automated Quality Control Systems</td>
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<tr>
<td>16:30-18:00</td>
<td>Parallel Session BIOMATHEMATICS</td>
<td>(Flamingo Grand Jaco Hall) Chair: Petr Vabishchevich</td>
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<tr>
<td>16:30-17:00</td>
<td>Speaker: Ekaterina Ekaterinchuk</td>
<td>Title: Stochastic Generation of Spatial Patterns in Brusselator</td>
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<tr>
<td>17:00-17:30</td>
<td>Speaker: Evdokia Slepukhina</td>
<td>Title: Analysis of Stochastic Phenomena in 2D Hindmarsh-Rose Neuron Model</td>
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<tr>
<td>17:30-18:00</td>
<td>Speaker: Anna Antonova/Michail Todorov</td>
<td>Title: A Comparative Analysis of Goodwin’s Business Cycle</td>
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Models with Continuously Distributed Lags
FRIDAY, JUNE 24, 2016

08:30-09:30 Flamingo Grand Hall
Chair: Michail Todorov
PLENARY LECTURE: Igor Tsukerman
Title: Effective Medium Theories from the 19th to the 21st Century: Finite Samples, Interface Boundaries, Non-Asymptotic and Nonlocal Approximations

09:30-10:00 COFEE BREAK

10:00-12:00 Parallel Session CONTINUUM MECHANICS
Flamingo Grand Hall
Chair: Nectarios Papanicolaou

10:00-10:30 Speaker: Vladimir Sadovskiy
Title: Modeling of Fan Formation in a Shear Rupture Head on the Basis of Singular Solutions of Plane Elasticity

10:30-11:00 Speaker: Evgeny Chentsov
Title: Analysis of Oscillation Processes in a Blocky Medium by Means of Discrete and Continuous Models

11:00-11:30 Speaker: Oxana Sadovskaya
Title: Method of Superposition of Dislocations for Finding Stress-Strain State around Fan-Shaped Structure in a Brittle Rock

11:30-12:00 Speaker: Dobri Dankov
Title: Thermo-Acoustic Waves in Rarefied Gas between Two Coaxial Cylinders in the Temperature Suddenly Change of the Outer Cylinder

POSTER SESSION DURING THE COFEE BREAK
(Flamingo Grand Hall)
Marios Christou
*On-axis Electromagnetic Scattering from a Sub-Wavelength Aperture on a Conducting Screen*

Ivanka Zheleva, Margarita Filipova
*Atmospheric Characteristics Statistic Study of Rousse Region, Bulgaria*

Tsvetanka Kovacheva, etc.

12:00-13:00 LUNCH

14:15-20:30 EXCURSION BY BUS TO THE GOVERNMENTAL RESIDENCE OF EUXINOGRADE AND THE CLAM FARM IN THE GULF OF DALBOKA
### SATURDAY, JUNE 25, 2016

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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>08:30-09:30</td>
<td>PLENARY LECTURE (informal): Alexander Kurganov</td>
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<td>Title: <em>Central-Upwind Schemes for Shallow Water Models</em></td>
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<td>(Flamingo Grand Hall)</td>
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<td>Chair: Michail Todorov</td>
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<td>09:30-10:00</td>
<td>COFFEE BREAK</td>
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<td>10:00-12:00</td>
<td>Special Session COMPUTATIONAL FINANCE</td>
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<td>(Flamingo Grand Hall)</td>
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<td>Chair: Igor Tsukerman</td>
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<td>10:00-10:30</td>
<td>Speaker: Zuzana Buckova</td>
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<td></td>
<td>Title: <em>Advanced Numerical Methods in Finance for Black-Scholes Model</em></td>
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<td>10:30-11:00</td>
<td>Speaker: Pedro Polvora</td>
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<td>Title: <em>Derivative Pricing in Markets with Transaction Costs</em></td>
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<td>11:00-11:30</td>
<td>Speaker: Andre Ribeiro</td>
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<td>Title: <em>Pricing and Hedging Correlation Swaps with a 2-Factor Model</em></td>
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<td>11:30-12:00</td>
<td>Speaker: Avi Messica</td>
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<td>Title: <em>A Simple Low Computation Intensity Model for Approximating the Distribution Function of a Sum of Non-Identical Lognormals for Financial Applications</em></td>
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<tr>
<td>10:00-12:00</td>
<td>Parallel Session CONTINUUM MECHANICS</td>
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<td>(Flamingo Grand Jacc Hall)</td>
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<td>Chair: Vladimir Sadovsky</td>
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<td>10:00-12:00</td>
<td>Speaker: Anatoly Filippov</td>
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<td>Title: <em>Comparing Two New Models for Asymmetry of Current</em></td>
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</tbody>
</table>
### Voltage Characteristics of Modified Ion-Exchange Membranes

**10:30-11:00**  
Speaker: Aleksei Taiursky  
Title: *Solitons in Two-Fluid MHD with Electron Inertia*

**11:00-11:30**  
Speaker: Maria Varygina  
Title: *Numerical Modeling of Wave Propagation Processes in Micropolar Rods and Thin Plates*

**11:30-12:00**  
Speaker: Sonya Tabakova - cancelled  
Title: *Velocity and Shear Rate Estimates of Some Non-Newtonian Oscillatory Flows in Tubes*

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**12:00-14:00 LUNCH**

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### Session MATHEMATICAL PHYSICS AND TRANSPORT PROCESSES  
(Flamingo Grand Hall)  
Chair: Vladimir Gerdjikov

**14:00-14:45**  
KENOTE LECTURE: Annalisa Calini  
Title: *Stability of Vortex Filaments*

**14:45-15:30**  
KENOTE LECTURE: Ivan Koprinkov/Michail Todorov  
Title: *Dynamics of High-intensity Ultrashort Light Pulses at Some Basic Propagation Regimes*

**15:30-16:00**  
Parallel Session SCIENTIFIC COMPUTING  
(Flamingo Grand Hall)  
Chair: Todor Gurov

**15:30-16:00**  
Speaker: Christoph Schmuedderich  
Title: *The Method of Kinematic Elements in Geotechnics – New Developments and Applications*

**15:30-16:00**  
Special Session COMPUTATIONAL FINANCE  
(Flamingo Grand Jaco Hall)  
Chair: Zuzana Buckova
15:30-16:00 Speaker: Igor Kossaczky
Title: Modifications of PCPT Method for HJB Equation

16:00-16:30 COFEE BREAK

16:30-18:00 Parallel Session SCIENTIFIC COMPUTING
(Flamingo Grand Hall)
Chair: Todor Gurov

16:30-17:00 Speaker: Stanislav Stoykov
Title: Nonlinear Dynamical Analysis of Plates by Efficient Parallel Algorithms

17:00-17:30 Speaker: Alexander Vasilyev
Title: Solution of the Neutronics Code Dynamic Benchmark by Finite Element Method

17:30-18:00 Speaker: Rosangela Sviercoski
Title: Description of Data Reanalysis of Discharge and Gauge Height for the Amazon River Basin

16:30-18:00 Special Session COMPUTATIONAL FINANCE
(Flamingo Grand Jaco Hall)
Chair: Zuzana Buckova

16:30-17:00 Speaker: Zuzana Buckova/Igor Tsukerman
Title: Traditional vs. Trefftz Difference Schemes for the Black-Scholes Equation

17:00-17:30 Parallel Session CONTINUOUS MECHANICS
(Flamingo Grand Jaco Hall)
Chair:

Speaker: Samir Habibi - cancelled
Title: Exploitation of Statistical Tools to Determine the Law Behavior of Materials by Nanoindentation
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</table>
| 17:30-18:00 | Parallel Session APPLIED ANALYSIS  
(Flamingo Grand Jaco Hall)  
Chair: |
| | Speaker: Ivanka Stamova - cancelled  
Title: *On the Stability and Control Strategies for Impulsive Lotka-Volterra Systems of Fractional Order* |
| 20:00 | BANQUET DINNER, RESTAURANT OF RAI (PARADISE).  
MEETING POINT RECEPTION OF FLAMINGO GRAND HOTEL, 19:45 |
**SUNDAY, JUNE 26, 2016**

08:30-09:30  PLENARY LECTURE: Petia Radeva  
**Title:** Recognizing Food through Deep Learning and Egocentric Vision  
(Flamingo Grand Hall)  
Chair: Michail Todorov

09:30-10:00  COFEE BREAK

10:00-11:00  Parallel Session MATHEMATICAL PHYSICS AND TRANSPORT PROCESSES  
(Flamingo Grand Hall)  
Chair: Petia Radeva

10:00-10:30  Speaker: Nicoleta-Corina Babalic  
**Title:** Super-Solitons and Mixed Solutions for Defocusing Super-Gardner Equation

10:30-11:00  Speaker: Anna Efimova  
**Title:** Numerical Models of Ion-acoustic Collisionless Shock

11:00-11:30  Speaker: Vladimir Gerdjikov  
**Title:** Manakov Soliton Trains: External Potentials and Cross-Modulation Effects. Part I

11:30-12:00  Speaker: Michail Todorov  
**Title:** Manakov Soliton Trains: External Potentials and Cross-Modulation Effects. Part II

10:00-12:00  Parallel Session SCIENTIFIC COMPUTING  
(Flamingo Grand Jaco Hall)  
Chair: Anatoly Filippov

10:00-10:30  Speaker: Valentin Gushchin  
**Title:** Free Surface Fluid Flows Modeling
10:30-11:00 Speaker: Teodor Grigorie
Title: *Numerical Study of an Error Model for a Strap-down INS*

11:00-11:30 Speaker: Sergei Stepanov
Title: *Numerical Simulation of the Convective Heat Transfer on High-Performance Computing Systems*

11:30-12:00 Speaker: Nectarios Papanicolaou
Title: *A Discontinuous Galerkin Finite Element Method for High-Prandtl Number Non-Fourier Convection*

12:00-14:00 LUNCH

14:00-16:00 Parallel Session NUMERICAL METHODS
(Flamingo Grand Hall)
Chair: Vladimir Shaydurov

14:00-14:30 Speaker: Vasily Vasilyev
Title: *On the Numerical Solution of the Boundary Inverse Problem for a Parabolic Equation*

14:30-15:00 Speaker: Maria Vasilyeva
Title: *Generalized Multiscale Finite Element Method (GMsFEM) for Non-Newtonian Fluid Flow in Perforated Domains*

15:00-15:30 Speaker: Svetlana Tikhovskaya
Title: *Polynomial Interpolation of the Function of Two Variables with Large Gradients in the Parabolic and Exponential Boundary Layers*

15:30-16:00 Speaker: Vladimir Ostapenko
Title: *On the Monotonicity of Multidimensional Difference Schemes*

14:00-15:30 Parallel Session COMPUTER SCIENCE, APPLIED ANALYSIS
(Flamingo Grand Jaco Hall)
Chair: Vladimir Gerdjikov

14:00-14:30  Speaker: Katarzyna Wasielewska  
Title: Agent in Grids Extended to Clouds

14:30-15:00  Speaker: Mikhail Gusev  
Title: Application of Penalty Function Method to Computation of Reachable Sets for Control Systems with State Constraints

15:00-15:30  Speaker: Roumen Anguelov  
Title: Asymmetric Metric: Application to Dealing with Uncertainty

16:00-16:30  COFEE BREAK

16:30-17:30  Contributed Session SCIENTIFIC COMPUTING  
(Flamingo Grand Hall)  
Chair: Vladimir Ostapenko

16:30-17:00  Speaker: Lyudmila Vshivkova  
Title: Hybrid Numerical Model of Shock Waves in Collisionless Plasma

17:00-17:30  Speaker: Grigory Parshikov  
Title: On Some Questions in Computer Modeling of the Reachability Sets Constructing Problems
MONDAY JUNE 27, 2016

08:30-09:30 PLENARY LECTURE: Alexandre Fedoseyev
Title: A Universal Framework for Non-deteriorating Time-domain Numerical Algorithms in Maxwell's Electrodynamics
(Flamingo Grand Hall)
Chair: Michail Todorov

09:30-10:00 COFEE BREAK

10:00-12:00 Session NUMERICAL METHODS
(Flamingo Grand Hall)
Chair: Alexandre Fedoseyev

10:00-10:30 Speaker: Tatiana Filippova
Title: Estimates of Reachable Sets of Impulsive Control Problems with Special Nonlinearity

10:30-11:00 Speaker: Alexander Vyatkin
Title: The Conservative Semi-Lagrangian Method for the Advection Problem with the Bogner-Fox-Schmit Elements on Rectangles

11:00-11:30 Speaker: Ekaterina Dementyeva
Title: The Inexact Uzawa - Conjugate Gradient Method for the Stokes Problem for Incompressible Fluid

11:30-12:00 Speaker: Venelin Todorov
Title: Monte Carlo methods for Numerical Integration for European Option Pricing

10:00-10:30 Session SCIENTIFIC COMPUTING
(Flamingo Grand Jaco Hall)
Chair: N
10:00-10:30 Speaker: Elena Zemlyanaya
Title: Numerical Study of a Model of Stacked Long Josephson Junctions

10:30-11:00 Session COMPUTER SCIENCE
(Flamingo Grand Jaco Hall)
Chair: Aneta Karaivanova

10:30-11:00 Atanas Radenski/Todor Gurov
Big Data Platforms, Systems and Applications: Experience from Academia

11:00-11:30 Session APPLIED ANALYSIS
(Flamingo Grand Jaco Hall)
Chair: Vladimir Gerdjikov

11:00-11:30 Speaker: Julian Dimitrov
Title: Functional Analysis of Recoverability from Discrete Presented Continuous Dependence

12:00-14:00 LUNCH

14:00-15:00 Parallel Session NUMERICAL METHODS
(Flamingo Grand Hall)
Chair: Michail Todorov

14:00-14:30 Speaker: Eugenia Karepova
Title: New Hermitian Finite Elements on Rectangles with Useful Properties for Spectral and Parabolic Problems

14:30-15:00 Speaker: Elena Kostousova
Title: On Estimating Reachable Sets for Multi-Agent Motion: Discrete-Time Dynamic Systems

14:00-15:00 Parallel Session COMPUTER SCIENCE
(Flamingo Grand Jaco Hall)
Chair: Vladimir Gerdjikov
14:00-14:30 Speaker: Aneta Karaivanova
Title: *On the Parallelization Approaches for Intel MIC Architecture*

14:30-15:00 Speaker: Todor Gurov
Title: *Estimating Population Size of the Bulgarian Brown Bear Population*

15:00-15:30 COFEE BREAK

15:30 RECAPITULATION AND CLOSING SESSION OF THE CONFERENCE (Falmingo Grand Hall)