MASTER PROGRAM

for

SEVENTH INTERNATIONAL CONFERENCE
APPLICATION OF MATHEMATICS IN TECHNICAL AND NATURAL
SCIENCES
ALBENA, JUNE 28-JULY 3, 2015

SATURDAY, JUNE 27, 2015

17:00-19:00   REGISTRATION
                 Flamingo Grand Hotel – 3rd floor

SUNDAY, JUNE 28, 2015

07:30-08:30	REGISTRATION Flamingo Grand Hotel – 3rd floor
08:30-09:00	OPENING (Flamingo Grand Hall)
09:00-10:00	PLENARY LECTURE: Alexander Samsonov (Flamingo Grand Hall) Chair: Michail Todorov Title: *Bulk Solitary Waves in Elastic Solids*

10:00-10:30 COFEE BREAK

	Special Session ADVANCED MATERIAL CHARACTERIZATION, MODELLING, AND NUMERICAL SIMULATION[*] (Flamingo Grand Hall) Chair: Maria Datcheva
10:30-11:15	KEYNOTE LECTURE: Svetozar Margenov Title: *Robust AMLI PCG Iterative Solution Methods for Problems with Strongly Heterogeneous Coefficients*
11:15-12:00	KEYNOTE LECTURE: Anatoly Filippov Title: *Characterization of Perfluorinated Cation-exchange Membranes MF-4SC Surface Modified with Halloysite Nanotubes*

12:00-14:00   LUNCH

14:00-15:30	Special Session ADVANCED MATERIAL CHARACTERIZATION, MODELLING, AND NUMERICAL SIMULATION (Flamingo Grand Hall) Chair: Svetozar Margenov

14:00-14:30	Speaker: Nevena Ilieva Title: *Solitons and Protein Folding: An* in silico *Experiment*
14:30-15:00	Speaker: Rosangela Sviercoski Title: *Upscaling the Coupled Water Flow and Heat Transfer near Subsurface - Comparison between Numerical and Field Data*
15:00-15:30	Speaker: Ivan Georgiev Title: *Advance Characterisation of Structure and Properties of Composites*

14:00-15:30	Parallel Session NUMERICAL METHODS (Flamingo Grand Jaco Hall) Chair: Vladimir Gerdjikov
14:00-14:30	Speaker: Stefka Dimova Title: *Numerical Methods for Hamiltonian Systems: Implementation and Comparison*
14:30-15:00	Speaker: Svetlana Tikhovskaya Title: *Solving a Semilinear Convection-diffusion Problem by a Two-grid Method with Richardson Extrapolation*
15:00-15:30	Speaker: Alexander Vyatkin Title: *The Semi-Lagrangian Algorithm Based on an Integral Transformation for Three-Dimensional Advection Problems*

15:30-16:00	COFEE BREAK

16:00-17:30	Parallel Session SCIENTIFIC COMPUTING (Flamingo Grand Hall) Chair: Alexaander Samsonov
16:00-16:30	Speaker: Desislava Voynikova Title: *Modeling the Effect of Meteorological Factors on SO2 and PM10 Concentrations in SARIMA method and Model*

Refinement

16:30-17:00	Speaker: Andreas Savva Title: *A Surface Generator*
17:00-17:30	Speaker: Atanas Ivanov Title: *Using PCA and General Path Seeker Regression for Investigation of Air Pollution and CO Modeling*
17:30-18:00	Parallel Session APPLIED ANALYSIS & MATHEMATICAL PHYSICS (Flamingo Grand Hall)
17:30-18:00	Speaker: Veliko Donchev *On the Compositions of Rotations*

16:00-17:30	Parallel Session NUMERICAL METHODS (Flamingo Grand Jaco Hall) Chair: Vladimir Gerdjikov
16:00-16:30	Speaker: Nectarios Papanicolaou Title: *High-Order Discontinuous Galerkin Methods for Coupled Thermoconvective Flows under Gravity Modulation*
16:30-17:00	Speaker: Mehrdad D. Tirani Title: *Numerical Solution of Differential-difference Equations in Large Intervals Using a Taylor Collocation Method*
17:00-17:30	Speaker: Majid Kajani Title: *A Direct Multi-step Legendre-Gauss Collocation Method for High-order Volterra Integro-differential Equation*

20:00	WELCOME PARTY – Ganvie Beach Club

_____

MONDAY, JUNE 29, 2015

[i]08:30-09:30   PLENARY LECTURE: Vladislav Pukhnachev
                        Title: *Mathematical Models of Polymer Solutions Motion and*
                        Their Symmetries
                        (Flamingo Grand Hall)
                        Chair: Michail Todorov

_____

09:30-10:00 COFEE BREAK

10:30-12:00   Parallel Session APPLIED ANALYSIS & MATHEMATICAL
                        PHYSICS
                        (Flamingo Grand Hall)
                        Chair: Vladislav Pukhnachev

10:00-10:30   Speaker: Nikolay Kutev
                        Title: *Generalized Nehari Functional and Global Solvability of*
                        Boussinesq Equation

10:30-11:00   Speaker: Natalia Kolkovska
                        Title: *Numerical Computation of the Critical Energy Constant*
                        for Two-dimensional Boussinesq Equations

11:00-11:30   Speaker: Marios Christou
                        Title: *A Sixth Order Generalized Boussinesq Type Equation*
                        using Hirota's Method

11:30-12:00   Speaker: Martin Lints
                        Title: *Solitary Waves for Non-Destructive Testing Applications:*
                        Delayed Nonlinear Time Reversal Signal Processing
                        Optimization

_____

10:00-11:30   Parallel Session APPLIED PHYSICS
                        (Flamingo Grand Jaco Hall)
                        Chair: Sonya Tabakova

10:00-10:30   Speaker: Astrid Rekker
                        Title: *Influence of the Basset Force on the Resonant Behavior*

of an Oscillator with Fluctuating Frequency

10:30-11:00	Speaker: Katrin Laas Title: *Resonance of Brownian Vortices in Viscoelastic Shear Flows*
11:00-11:30	Speaker: Leonid Turchak - **cancelled** Title: *Modeling of the Interaction of Meteoroids with the Martian Atmosphere*

12:00-14:00 LUNCH

Session BIOMATHEMATICS
(Flamingo Grand Hall)
Chair: Nikolay Kutev

14:00-14:45	KEYNOTE LECTURE: Roumen Anguelov Title: *On the Stability of Equilibria in Cross-diffusion Systems*

Session NUMERICAL METHODS
(Flamingo Grand Hall)
Chair: Nikolay Kutev

14:45-15:30	KEYNOTE LECTURE: Bojan Popov Title: *Recent Developments in Entropy Viscosity*

15:30-16:00   COFEE BREAK

16:00-17:30	Parallel Session APPLIED ANALYSIS & MATHEMATICAL PHYSICS (Flamingo Grand Hall) Chair: Stefka Dimova
16:00-16:30	Speaker: Kenji Tomoeda Title: *Appearance of Repeated Support Splitting and Merging Phenomena in a Porous Media Equation with Absorption*

16:30-17:00	Speaker: Ivan Koprinkov Title: *Robust Ultrashort Laser Pulse Formation in Ionization Free Regime Propagation*
17:00-17:30	Speaker: Ivan Raykov Title: *More Applications of Fitzpatrick Functions for Solving Optimization Problems*

16:00-16:30	Parallel Session NUMERICAL METHODS (Flamingo Grand Jaco Hall) Chair: Ivanka Zheleva
16:00-16:30	Speaker: Masoud Allame Title: *An Appropriate Method for Eigenvalues Approximation of Sixth-order Sturm-Liouville Problems by Using Integral Operation Matrix over the Chebyshev Polynomials*

16:30-17:30	Parallel Session COMPUTER SCIENCE (Flamingo Grand Jaco Hall) Chair: Ivanka Zheleva
16:30-17:00	Speaker: Dimitar Dimitrov Title: *Evaluation of Stochastic Algorithms for Financial Mathematics Problems from Point of View of Energy-efficiency*
17:00-17:30	Speaker: Katarzyna Wasielewska Title: *Multicriterial Analysis and Ontologically Represented Information*

TUESDAY, JUNE 30, 2015

08:30-09:30   Flamingo Grand Hall
                               Chair: Michail Todorov

                               PLENARY LECTURE: Peter Minev
                               Title: *High-order Artificial Compressibility for the Navier-Stokes Equations*

09:30-10:00 COFEE BREAK

10:00-12:00   Parallel Session CONTINUUM MECHANICS
                               Flamingo Grand Hall
                               Chair: Peter Minev

10:00-10:30   Speaker: Vladimir Sadovskii
                               Title: *Mathematical Modeling of Deformation of a Porous Medium, Considering Its Strengthening Due to Pore Collapse*

10:30-11:00   Speaker: Sonya Tabakova
                               Title: *Nonlinear Drainage of Some Non-Newtonian Free Films*

11:00-11:30   Speaker: Oxana Sadovskaya
                               Title: *Numerical Implementation of Mathematical Model of the Dynamics of a Porous Medium on Supercomputers of Cluster Architecture*

11:30-12:00   Speaker: Yonko Stoynov
                               Title: *The Influence of Inhomogeneity on the Behavior of Cracked Magneto-electro-elastic Materials*

12:30-14:00 LUNCH

13:15-18:30   EXCURSION BY THE ALI BABA YACHT TO THE GULF OF BYLATA LAGUNA. MEETING POINT THE RECEPTION OF FLAMINGO GRAND HOTEL

WEDNESDAY, JULY 1, 2015

05:29	Meeting the sunrise on the beach

08:30-09:30   Flamingo Grand Hall
Chair: Michail Todorov

PLENARY LECTURE: Vladimir Shaydurov
Title: *Mathematical and Numerical Modeling of the Pass of an Asteroid-Comet Body through the Earth's Atmosphere*

09:30-10:00   COFEE BREAK

10:00-12:00   Special Session ADVANCED MATERIAL CHARACTERIZATION, MODELLING, AND NUMERICAL SIMULATION[*]
(Flamingo Grand Hall)
Chair: Ivan Georgiev

10:00-10:30   Speaker: Elham Mahmoudi
Title: *Optimal Sensor Location for Parameter Identification in Soft Clay*

10:30-11:00   Speaker: Elena Lilkova
Title: *Molecular Modelling of the Interactions of Heparin-Derived Oligosaccharides, Human Interferon Gamma and Its Extracellular Receptors*

11:00-11:30   Speaker: Tzvetan Ostromsky
Title: *Calculation of Geodesic Polygons with Strongly Dominant Angle Error*

11:30-12:00   Speaker: Evgeni Koytchev
Title: *Micromechanical (Microhardness) Testing of the Dentin Hybrid Zone Formed by Different Types of Adhesive Systems in Sound Human Dentin*

10:00-10:30   Parallel Session CONTINUUM MECHANICS

(Flamingo Grand Jaco Hall)
Chair: Vladimir Shaydurov

10:00-12:00   Speaker: Oxana Frolovskaya
                   Title: *Numerical Investigation of Unsteady Axisymmetric Stagnation-Point Flow*

10:30-11:00   Speaker: Aleksei Taiursky
                   Title: *Nonlinear Absorption of Alfven Wave in Dissipative Plasma*

11:00-11:30   Speaker: Dobri Dankov
                   Title: *Transient Heat Transfer in Viscous Rarefied Gas between Concentric Cylinders. Effect of Curvature*

11:30-12:00   Speaker: Jasmina Kojouharova
                   Title: *ANSYS CFX Wall-Function Approach for Modeling of Fully Separated Flow past a Circular Cylinder: Problems and Simulation Practical Guide*

_____

12:00-14:00 LUNCH

_____

                   Session NUMERICAL METHODS
                   (Flamingo Grand Hall)
                   Chair: Natalia Kolkovska

14:00-14:45   KENOTE LECTURE: Raytcho Lazarov
                   Title: *Recent Advances in Numerical Methods for Fractional Differential Equations*

                   Special Session ADVANCED MATERIAL CHARACTERIZATION, MODELLING, AND NUMERICAL SIMULATION
                   (Flamingo Grand Hall)
                   Chair: Roumen Iankov

14:45-15:30   KENOTE LECTURE: Gabriella Bolzon
                   Title: *Experimental and Computing Strategies in Advanced*

Material Characterization Problems

15:30-16:00	COFEE BREAK

16:00-17:30	Special Session ADVANCED MATERIAL CHARACTERIZATION, MODELLING, AND NUMERICAL SIMULATION[*] (Flamingo Grand Hall) Chair: Roumen Iankov
16:00-16:30	Speaker: Maria Datcheva Title: *Nanomechanical Testing of Thin Composite Layers - Application to Pd-In Electrochemically Deposited Thin Films*
16:30-17:30	Speaker: Sabina Cherneva Title: *Investigation of the Influence of the Concentrations of Sn in Electrochemically Deposited CuSn Alloy Films on Their Mechanical Properties*
17:00-17:30	Speaker: Mirona Mironova/M. Ivanova *Study of Fiber - Reinforcement Self-Compacting Concretes*

16:00-17:30	Parallel Session NUMERICAL METHODS (Flamingo Grand Jaco Hall) Chair: Raytcho LazarovE
16:00-16:30	Speaker: Alexander Vyatkin Title: *Some Features of CUDA Implementation of Semi-Lagrangian Method for an Advection Problem*
16:30-17:00	Speaker: Ekaterina Dementyeva Title: *The Numerical Solution of Navier-Stokes Equations for Viscous Incompressible Fluid by Semi-Lagrangian Approximation in the Finite Element Method*
17:00-17:30	Speaker: Igor Kireev Title: *Reduction of Linear Hamiltonian Systems of Ordinary Differential Equations*

19:00   BANQUET DINNER, INN OF IVANCHOV,
                 ST.ST.CONSTANTINE AND HELENA. MEETING POINT
                 RECEPTION OF FLAMINGO GRAND HOTEL

_____

THURSDAY, JULY 2, 2015

08:30-09:30   PLENARY LECTURE: Jianzhong Su
                     Title: *Modeling, Simulation and PDE Stability Analysis for*
                      Foreign Body Fibrotic Reactions- **cancelled**

08:30-09:30   Poster Session
                     (Flamingo Grand Hall)

Anna Antonova, *Dynamics of the Driven Goodwin Business Cycle Equation*

Ivan G. Ivanov, *Numerical Solvers to the Stabilizing Solution of Perturbed Algebraic Riccati Equations in LQ Zero-sum Games*

Anna Lecheva, *Fluid Flow Structure around the Mixer in a Bioreactor with Mechanical Stirring*

Ivanka Zheleva, *Numerical Study of Fluid Motion in Cylindrical Reactor with Two Mixers*

Snezhana Kostova, *LQR Problem of Linear Discrete Time Systems with Nonnegative State Constraints*

09:30-10:00   COFEE BREAK

10:00-11:00   Parallel Session BIOMATHEMATICS
                     (Flamingo Grand Hall)
                     Chair: Nikolay Kutev

10:00-10:30   Speaker: Neeme Lumi
                     Title: *Sign Reversals of the Output Autocorrelation Function*
                     for the Stochastic Bernoulli-Verhulst Equation

10:30-11:00   Speaker: Gabriel Dimitriu
                     Title: *Numerical Approach of an Optimal Control Problem for*
                     a Model of Tissue Invasion by Solid Tumours

11:00-12:00	Parallel Session APPLIED ANALYSIS & MATHEMATICAL PHYSICS (Flamingo Grand Hall) Chair: Nikolay Kutev
11:00-11:30	Speaker: Vladimir Gerdjikov Title: *Manakov Soliton Trains and External Potentials: Criterium of Adiabaticity. Part I*
11:30-12:00	Speaker: Michail Todorov Title: *Manakov Soliton Trains and External Potentials: Criterium of Adiabaticity. Part II*

10:00-12:00	Parallel Session NUMERICAL METHODS (Flamingo Grand Jaco Hall) Chair: Ivan Georgiev
10:00-10:30	Speaker: Ivan Bazhlekov Title: *Numerical Modeling of Biosurfactants in Multiphase Flows*
10:30-11:00	Speaker: Masahisa Tabata Title: *Numerical Simulations of Two-fluid Flow Problems by an Energy-stable Lagrange-Galerkin Scheme*
11:00-11:30	Speaker: Maxim Yakubovich Title: *Methods of Trajectories and Finite Elements in a Problem of the Supersonic Flow in the Asymmetrical Channel*
11:30-12:00	Speaker: Valery Shematovich Title: *Monte Carlo Approach for Studies of the Flows near Natural and Technogenic Objects in the Earth's Upper Atmosphere* - **cancelled**

12:00-14:00 LUNCH

14:00-15:30	Parallel Session APPLIED ANALYSIS & MATHEMATICAL PHYSICS (Flamingo Grand Hall) Chair: Bojan Popov

14:00-15:30 Parallel Session APPLIED ANALYSIS & MATHEMATICAL PHYSICS
(Flamingo Grand Hall)
Chair: Bojan Popov

14:00-14:30 Speaker: Nicoleta-Corina Babalic
Title: *Bilinear Supersymmetric Gardner Equation and Its Soliton Solutions*

14:30-15:00 Speaker: Victor Lyashenko/Elena Kobilskaya
Title: *Contact Boundary Value Problems and Nonlocal Problems in Mathematical Models of Heat Transfer*

15:00-15:30 Speaker: Daniela Georgieva
Title: *Merging and Energy Exchange between Optical Filaments*

14:00-15:30 Parallel Session OTHERS
(Flamingo Grand Jaco Hall)
Chair: Michail Todorov

14:00-14:30 Speaker: Krassimira Vlachkova/Ognian Kassabov
Title: *Bi-quartic Parametric Polynomial Minimal Surfaces*

14:30-15:00 Speaker: Ivan Ourdev
Title: *A Tale of Two Tails: Investing with the Return Distribution*

15:00-15:30 Speaker: Tsvetanka Kovacheva
Title: *Decision Making in Prioritization of Required Operational Capabilities* - **cancelled**

15:30-16:00 COFEE BREAK

16:00-18:00 Parallel Session APPLIED ANALYSIS & MATHEMATICAL PHYSICS

(Flamingo Grand Hall)
Chair: Nikolay Kutev

16:00-16:30   Speaker: Todor Stoyanov
               Title: *Some New Estimates of the Modulus of Some Integrals of the Unit Circle in the Complex Plane*

16:30-17:00   Speaker: Emilia Bazhlekova
               Title: *On the Rayleigh-Stokes Problem for Generalized Oldroyd-B Fluids*

17:00-17:30   Speaker: Daniela Vasileva
               Title: *Finite-difference Approximation for Two-dimensional Generalized Oldroyd-B Fluids*

17:30-18:00   Speaker: Petras Rupsys
               Title: *The Use of Copulas to Practical Estimation of Multivariate Stochastic Differential Mixed-Effects Models*

FRIDAY JULY 3, 2015

08:30-09:30   PLENARY LECTURE: Nikolay Kolev
                     Title: *SKYTHIA: A Universal Multi-phase Analyzer*
                     (Flamingo Grand Hall)
                     Chair: Michail Todorov

_____

09:30-10:00   COFEE BREAK

_____

10:00-12:00   Session SCIENTIFIC COMPUTING
                     (Flamingo Grand Hall)
                     Chair: Nikolay Kolev

10:00-10:30   Speaker: Valentin Gushchin
                     Title: *Classification of the Stratified Fluid Flows Regimes
                     around a Square Cylinder*

10:30-11:00   Speaker: Elena Zemlyanaya
                     Title: *Numerical Simulation of Photoexcited Polaron States in
                      Water*

11:00-11:30   Speaker: Anna Efimova
                     Title: *Numerical Simulation of Plasma Turbulence During the
                      Injection of the Electron Beam*

11:30-12:00   Speaker: Jordan Genoff
                     Title: *Extremely High-Precision Computations in Large-Scale
                     Classical and Quantum Molecular Mechanics Simulation -*
                     cancelled

_____

12:00   RECAPITULATION AND CLOSING OF THE
                     CONFERENCE