

PROGRAM
for
FIRST INTERNATIONAL CONFERENCE
APPLICATION OF MATHEMATICS IN TECHNICAL AND NATURAL
SCIENCES
SOZOPOL
JUNE 22-26, 2009

SUNDAY, JUNE 21, 2009

17:00-19:00 REGISTRATION
Hotel Selena

MONDAY, JUNE 22, 2009

07:30-08:30 REGISTRATION
Hotel Selena

08:30-09:00 OPENING

09:00-10:00 Room A
Chair: Michail Todorov
PLENARY LECTURE: Francois Feuillebois
Title: *Particles in Creeping Flow Near a Slip Wall*

10:00-10:15 COFEE BREAK

10:15-11:15 Room A
Chair: Francois Feuillebois
PLENARY LECTURE: Bernard Beauzamy
Title: *Mathematical Tools for Energy Production,
Transportation and Storage*

11:15-12:00 KEYNOTE SPEAKER: Stoytcho Yazadjiev
Title: *Solitons and Concentric Rotating Black Rings with
Dipole Charge*

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

14:00-16:00 Parallel Session APPLICATIONS IN ECONOMICS,
Room A
Chair: Peter Minev
14:00-14:30 Speaker: Fernanda Ferreira
Title: *Capacity Choice under Demand Uncertainty*
14:30-15:00 Speaker: Beata Stehlikova
Title: *Fast Time Scale of Volatility in Interest Rate Models*
15:00-15:30 Speaker: Flavio Ferreira
Title: *Endogenous Timing in a Differentiated Duopoly*
15:30-16:00 Speaker: Tanya Melton
Title: *Rapid Convergence via Generalized Quasi-linearization
Method for Impulsive Differential Equations*

14:00-16:00 Parallel Session APPLICATIONS IN PHYSICS,
Room B
Chair: Reinaldo Rosa
14:00-14:30 Speaker: Snezhana Gocheva-Ilieva
Title: *Classifying the Basic Parameters of Ultraviolet Copper
Bromide Laser with Constant Coefficients*
14:30-15:00 Speaker: Dimo Dimov
Title: *Histogram Optimal Multithresholding*
15:00-15:20 Speaker: Kiril Alexiev
Title: *3D Scene Restoration Using One Active PTZ Camera*
15:20-15:40 Speaker: Stefan Bonchev
Title: *Super-resolution with the Help of Active Camera*
15:40-16:00 Speaker: Nikolai Denev
Title: *Cluster Analysis for Determination of the Influence of
Basic Laser Parameters on Copper Bromide Vapor Laser
Efficiency*

16:00-16:10 COFEE BREAK

16:10-17:40 Parallel Session CONTINUUM MECHANICS,
Room A
Chair: Sanichiro Yoshida

16:10-16:40 Speaker: Juan Olives
Title: *Singularities at a Solid-fluid-fluid Triple Contact Line,*

- for an Elastic Solid*
16:40-17:10 Speaker: Nectarios Papanicolaou
Title: *Two-Gradient Convection in a Vertical Slot with Maxwell-Cattaneo Heat Conduction Law*
- 17:10-17:40 Speaker: Sonia Tabakova
Title: *Freezing of a Suspended Supercooled Droplet with a Heat Transfer Mixed Condition on Its Outer Surface*
- 16:10-17:40 Parallel Session BIOMATHEMATICS, Room B
Chair: Vladimir Ostapenko
- 16:10-16:40 Speaker: Rumen Anguelov
Title: *Continuous Age-Structured Model of Bovine Tuberculosis in African Buffalo*
- 16:40-17:10 Speaker: Anna Antonova
Title: *Amplitude-Phase Formulation for a Discrete Two Species Lotka-Volterra System Integrated Circuits*
- 17:10-17:40 Speaker: Jeremy Thibodeaux
Title: *A Mathematical Model of Erythropoiesis Subject to Malaria Infection*
- 19:30 WELCOME PARTY

THUESDAY, JUNE 23, 2009

- 08:30-09:30 Room A
Chair: Michail Todorov
- PLENARY LECTURE: Vladimir Gerdjikov
Title: *Spinor Bose-Einstein Condensates and Soliton Solutions of Multi-component NLS Models*
- 09:30-09:45 COFFEE BREAK
- Room A
Chair: Vladimir Gerdjikov
- 09:45-10:30 KEYNOTE SPEAKER: Vladimir Ostapenko
Title: *Finite-Difference Schemes for Hyperbolic Systems of Conservation Laws*
- 10:30-11:15 KEYNOTE SPEAKER: Stefka Dimova
Title: *Numerical Investigation of Josephson Junction Structures*
- 11:15-12:00 KEYNOTE SPEAKER: Luis Castro
Title: *Problems of Wave Diffraction by Quadrants Analysed by a Half-line Potential Approach*
- 12:00-14:00 **LUNCH**
- 14:00-16:00 Special Session MATHEMATICS FOR ENERGY
PRODUCTION, TRANSPORTATION, AND STORAGE,
Room A
Chair: Bernard Beuzamy
- 14:00-14:40 Speaker: Bernard Beuzamy
Title: *Natural Gas Consumption, Importation and Storage*
- 14:40-15:20 Speaker: Helene Bikert
Title: *Mathematics for Investments Planning in Electricity Transportation*
- 15:20-16:00 Speaker: Stephan Miquel
Title: *Mathematics for Nuclear Waste Management*

- 14:00-16:00 Parallel Session APPLIED ANALYSIS, Room B
Chair: Stefka Dimova
- 14:00-14:30 Speaker: Vanyo Donev
Title: *Oscillatory Properties of First Order Neutral Delay Impulsive Differential Equations with Constant Coefficients*
- 14:30-15:00 Speaker: Pavel Krutitski
Title: *Helmholtz Equation in Domains Bounded by Closed Curves and Open Arcs*
- 15:00-15:30 Speaker: Zornitca Petrova
Title: *Oscillation Properties of Boussinesq Equation and Comparison with Other Fourth Order Equations*
- 15:30-16:00 Speaker: Olga Zeinalova
Title: *DSP Algorithms for Fission Fragment and Prompt Fission Neutron Spectroscopy*
- 16:00-16:10 COFEE BREAK
- 16:10-17:40 Special Session NUMERICAL SCHEMES FOR CONVECTIVE-ADVECTIVE PROBLEMS, Room A
Chair: Rossitza Marinova and Tchavdar Marinov
- 16:10-16:40 Speaker: Daishi Watabe
Title: *Numerical Stability Analysis of the Discretized Advection-Diffusion Equation on Non-uniform Mesh Size Grids*
- 16:40-17:10 Speaker: Tchavdar Marinov
Title: *Characteristic Line Scheme for Hierarchical Size-structured Model with Nonlinear Growth, Mortality and Reproduction Rate*
- 17:10-17:40 Speaker: Rossitza Marinova
Title: *Cubic Spline Approximation of the Coefficient f in Euler-Bernoulli Equation from Over-posed Data*
- 16:10-17:40 Parallel Session APPLICATIONS IN PHYSICS, Room B
Chair: Lyubomir Kovachev
- 16:10-16:40 Speaker: Katrin Laas
Title: *Friction-induced Resonance of a Stochastic Oscillator*
- 16:40-17:10 Speaker: Alberto Simoes

17:10-17:40

Title: *Fredholm Analysis of a Wave Diffraction Problem with Higher Order Boundary Conditions Annealing Method*

Speaker: Michail Todorov

Title: *Collision Dynamics of Initially Polarized Solitons in CNSE*

WEDNESDAY, JUNE 24, 2009

- 08:30-09:30 Room A
Chair: Michail Todorov
PLENARY LECTURE: Peter Minev
Title: *A Two-grid Fictitious Domain Method for Direct Simulation of Flows Involving Particles of a Very Small Size*
- 09:30-09:45 COFFEE BREAK
- 09:45-10:30 Room A
Chair: Peter Minev
KEYNOTE SPEAKER: Lubomir Dechevsky
Title: *Explicit Computation of the Cauchy-Riesz-Dunford Operator Integral in the Finite-dimensional Case*
- 10:30-11:15 KEYNOTE SPEAKER: Reinaldo Rosa
Title: *Numerical Simulation and Computational Analysis of Nonlinear Miscible Displacement Flows*
- 11:15-12:00 KEYNOTE SPEAKER: Mohammed Louaked
Title: *Multiresolution Scheme for Multiphase Flow*
- 12:00-14:00 **LUNCH**
- 14:00-18:00 **EXCURSION AND SOCIAL ACTIVITIES**
- 18:00-23:30 **BANQUET**

- 15:30-16:00 Speaker: Alexander Zoric
Title: *Computational Electronics on GRID: A Mixed Mode Carrier Transport Model*
- 14:00-16:00 Parallel Session CONTINUUM MECHANICS, Room B
Chair: Anna Okopinska
- 14:00-14:30 Speaker: Marios Christou
Title: *Numerical Investigation of the 2D Paradigm Boussinesq Equation*
- 14:30-15:00 Speaker: Claudia Timofte
Title: *Asymptotic Analysis in Dynamical Heat Transfer Problems in Heterogeneous Periodic Media*
- 15:00-15:30 Speaker: Ratko Pavlovic
Title: *Stochastic Stability of the Viscoelastic Rotating Shaft*
- 15:30-16:00 Speaker: Juri Kandilarov
Title: *An Immersed Interface FEM for Elliptic Problems with Local Own Sources*
- 16:00-16:10 COFEE BREAK
- 16:10-17:40 Parallel Session DIFFERENCE AND SPECTRAL METHODS, Room A
Chair: Mohammed Louaked
- 16:10-16:40 Speaker: Miglena Koleva
Title: *Use of the Two-Grid Method for a Heat Radiation Problem*
- 16:40-17:10 Speaker: Annastasis Polycarpou
Title: *Hybridization of the Vector Finite Element Method with the Boundary Integral Method for the Solution of Finite Arrays of Cavity-Backed Slot Antennas*
- 17:10-17:40 Speaker: Svetlana Lazareva
Title: *Theoretical and Numerical Analysis of the Fedorenko Finite Superelement Method with Constant Coefficients*
- 16:10-17:50 Special Session COMPUTATIONAL AND MATHEMATICAL APPROACHES IN THEORETICAL PHYSICS

Room B

Chair: Stoytcho Yazadjiev

- 16:10-16:30 Speaker: Daniela Doneva
Title: *Numerical Study of Linear Stability of Scalar-tensor Born-Infeld Black Holes*
- 16:30-16:50 Speaker: Ivan Stefanov
Title: *Solitons in the Scalar-tensor Theories of Gravity with Non-linear Electrodynamics*
- 16:50-17:10 Speaker: Petia Nedkova
Title: *Bulgaria Sequences of Dipole Black Rings and Kaluza-Klein Bubbles*
- 17:10-17:30 Speaker: Daniela Georgieva
Title: *Charged Black Holes with Massive Scalar Field*
- 17:30-17:50 Speaker: Dimiter Mladenov
Title: *Integrable Many-body Systems and Bianchi Cosmological Models*

FRIDAY, JUNE 26, 2009

Room A
Chair: Stoycho Yazadjiev

08:30-9:15 KEYNOTE SPEAKER: Shalom Shlomo
Title: *Determining a Modern Energy Density Functional for Nuclei Using The Simulating Annealing Method*

9:15-10:00 KEYNOTE SPEAKER: Oxana Frolovskaya
Title: *Stability in Liquid Systems with Interfaces*

10:00-10:15 COFEE BREAK

10:15-11:45 Contributed Session DIFFERENCE AND SPECTRAL METHODS
Room A
Chair: Shalom Shlomo

10:15-10:45 Speaker: Doichin Boyadzhiev
Title: *Increasing the Calculation Speed of an Acceleration Scheme for an Age-Structured Diffusion Model*

10:45-11:15 Speaker: Predrag Rajkovic
Title: *On Fractional q -Integrals, q -Derivatives, Corresponding Equations and Applications*

11:15-11:45 Speaker: Alexander Spivak
Title: *Optimal Control Problem for Some Non-linear Systems with Time Lag*

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

14:00-15:40 Contributed Session DIFFERENCE AND SPECTRAL METHODS, Room A
Chair: Oxana Frolovskaya

14:00-14:30 Speaker: Ivan G. Ivanov
Title: *Numerical Solvers for Generalized Algebraic Riccati Equations*

14:30-15:00

Speaker: Luben Vulkov

Title: *Fast Iteration Algorithms for Solution of Exponential Schemes of Semi-Linear Singularly Perturbed 2D Reaction-Convection Equations*

15:00-15:30

Speaker: Tanya Chernogorova

Title: *A Regularization Technique for Numerical Solution of an Initial-Boundary Value Problem in Price Formation*

16:00

CLOSING THE CONFERENCE

POSTER PRESENTATIONS

Robert Sych

*Detection of Quasi-stationary Features in MHD Turbulence of Molecular Clouds
Use the Time-scale Spectra*

Renna Djulgerova

Time-resolved Optogalvanic Signal Modeling in Ne Hollow Cathode Plasma

Ivanka Tr. Angelova

Finite Element Solution of 2D and 3D Elliptic Problems with Intersected Interfaces