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
THURSDAY, 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  COFEE BREAK

09:45-10:30  Room A
Chair: Vladimir Gerdjikov
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 STRAGE,
Room A
Chair: Bernard Beauzamy

14:00-14:40  Speaker: Bernard Beauzamy
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  COFFEE 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
Title: *Fredholm Analysis of a Wave Diffraction Problem with Higher Order Boundary Conditions Annealing Method*

17:10-17:40  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

09:30-09:45  COFEE 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 ACTVITIES

18:00-23:30  BANQUET
THURSDAY, JUNE 25, 2009

08:30-09:30  Room A
Chair: Michail Todorov
PLENARY LECTURE: Katsuhiro Sakai
Title: Toward Absolutely Stable Finite Difference Schemes with the Positivity Condition

09:30-09:45  COFEE BREAK

09:45-12:00  Room A
Chair: Katsuhiro Sakai

09:45-10:30  KEYNOTE SPEAKER: Anna Okopinska
Title: Optimized Spectral Approach to Quantum-Mechanical Problems

10:30-11:15  KEYNOTE SPEAKER: Sanichiro Yoshida
Title: Field Theoretical Approach to Dynamics of Deformation and Fracture

11:15-12:00  KEYNOTE SPEAKER: Lubomir Kovachev
Title: Single and Sub-cycle Optical Pulses in Air and Vacuum: Linear and Nonlinear Regime

12:00-14:00  LUNCH

14:00-16:00  Special Session GRID COMPUTING AND APPLICATIONS IN PHYSICS AND MECHANICS (GridCAMP), Room A
Chair: Todor Gurov

14:00-14:30  Speaker: Todor Gurov
Title: SALUTE Grid Application Using and Vacuum: Message-Oriented Middleware

14:30-15:00  Speaker: Radoslava Goranova
Title: User-defined Service in g-Lite

15:00-15:30  Speaker: Dobri Dankov
Title: Modeling of Cylindrical Couette Flow of Rarefied Gas. The Case of of Outer Rotating Cylinder
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 COFFEE 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