

Table of Contents

I Invited Papers

Eigenvalue Estimates for Preconditioned Saddle Point Matrices	3
<i>Owe Axelsson</i>	
A 3D Projection Scheme for Incompressible Multiphase Flows Using Dynamic Front Refinement and Reconnection	17
<i>Tong Chen, Peter Dimitrov Minev, and Krishnaswamy Nandakumar</i>	
Schwarz-Like Methods for Approximate Solving Cooperative Systems	25
<i>Ivo Marek</i>	
Computational Infrastructure for Parallel, Distributed, and Grid-Based Monte Carlo Computations	39
<i>Michael Mascagni and Yaohang Li</i>	
Parallel Solution of Very Large Sparse Systems of Linear Algebraic Equations	53
<i>Zahari Zlatev</i>	

II Recent Achievements in Preconditioning

Solution of Robust Linear Regression Problems by Krylov Subspace Methods	67
<i>Venansius Baryamureeba</i>	
Two-Level Preconditioning of Crouzeix-Raviart Anisotropic FEM Systems	76
<i>Gergana Bencheva, Ivan Georgiev, and Svetozar Margenov</i>	
Parallel High Performance Computing on Composite Grids	85
<i>Roman Kohut</i>	
Parallel Preconditioning for Sedimentary Basin Simulations	93
<i>Roland Masson, Philippe Quandalle, Stéphane Requena, and Robert Scheichl</i>	

III Monte Carlo and Quasi-Monte Carlo Methods

Modeling of Narrow-Width SOI Devices: The Role of Quantum Mechanical Narrow Channel Effects on Device Performance	105
<i>Shaikh S. Ahmed and Dragica Vasileska</i>	

Monte Carlo Algorithm for Ballistic Object Tracking with Uncertain Drag Parameter	112
<i>Donka Angelova, Iliyana Simeonova, and Tzvetan Semerdjiev</i>	
Efficient CPU-Specific Algorithm for Generating the Generalized Faure Sequences	121
<i>Emanouil I. Atanassov</i>	
A New Quasi-Monte Carlo Algorithm for Numerical Integration of Smooth Functions	128
<i>Emanouil I. Atanassov, Ivan T. Dimov, and Mariya K. Durchova</i>	
Monte Carlo Method for Multiple Knapsack Problem	136
<i>Stefka Fidanova</i>	
Importance Separation for Solving Integral Equations	144
<i>Rayna Georgieva and Sofiya Ivanovska</i>	
A Parallel Monte Carlo Method for Electron Quantum Kinetic Equation ..	153
<i>Todor V. Gurov and Ivan T. Dimov</i>	
Solving BVPs Using Quasirandom Walks on the Boundary	162
<i>Aneta Karaivanova, Michael Mascagni, and Nikolai A. Simonov</i>	
A Stable Backward Monte Carlo Method for the Solution of the Boltzmann Equation	170
<i>Hans Kosina, Mihail Nedjalkov, and Siegfried Selberherr</i>	
A Weight Decomposition Approach to the Sign Problem in Wigner Transport Simulations	178
<i>Mihail Nedjalkov, Hans Kosina, and Siegfried Selberherr</i>	
A Zero Field Monte Carlo Algorithm Accounting for the Pauli Exclusion Principle	185
<i>Sergey Smirnov, Hans Kosina, Mihail Nedjalkov, and Siegfried Selberherr</i>	

IV Set-Valued Numerics and Reliable Computing

Solution Methods for Age-Structured Optimal Control Models with Feedback	197
<i>Christian Almeder</i>	
Multivariate Rational Interpolation of Scattered Data	204
<i>Stefan Becuwe, Annie Cuyt, and Brigitte Verdonk</i>	
Approximation Methods for Nonconvex Parabolic Optimal Control Problems Using Relaxed Controls	214
<i>Ion Chrysosoverghi</i>	

Stabilizing Feedback of a Nonlinear Biological Wastewater Treatment Plants Model	222
<i>Neli Dimitrova and Mikhail Krastanov</i>	
Higher Order Approximations of Affinely Controlled Nonlinear Systems . .	230
<i>Nikolay Kirov and Mikhail Krastanov</i>	
Outlier Detection under Interval Uncertainty: Algorithmic Solvability and Computational Complexity	238
<i>Vladik Kreinovich, Luc Longpré, Praveen Patangay, Scott Ferson, and Lev Ginzburg</i>	
On the Approximation of Centered Zonotopes in the Plane	246
<i>Svetoslav Markov and Dalcidio Claudio</i>	
On Range Evaluation of Polynomials by Applying Interval Arithmetic . . .	254
<i>Shinya Miyajima and Masahide Kashiwagi</i>	
Sharp Bounds for Strains and Stresses in Uncertain Mechanical Models . .	262
<i>Evgenia D. Popova, Maria Datcheva, Roumen Iankov, and Tom Schanz</i>	
One Approximation to the Reachable Sets of Strongly Convex Differential Inclusions	270
<i>Nedka Pulova and Vladimir Pulov</i>	
Robust Methodology for Characterizing System Response to Damage: Approach Based on Partial Order	276
<i>Paul J. Tanenbaum, Carlos de la Mora, Piotr Wojciechowski, Olga Kosheleva, Vladik Kreinovich, Scott A. Starks, and Alexandr V. Kuzminykh</i>	

V Environmental Modelling

Comparison of Two Local Refinement Methods for Large Scale Air Pollution Simulations	287
<i>Anton Antonov, Krassimir Georgiev, Emilia Komsalova, and Zahari Zlatev</i>	
Testing Weighted Splitting Schemes on a One-Column Transport-Chemistry Model	295
<i>Mike Botchev, István Faragó, and Ágnes Havasi</i>	
Long-Range Transport of Dust to the Baltic Sea Region	303
<i>Marke Hongisto and Mikhail Sofiev</i>	
Atmospheric Dispersion and Pollutant Chemical Transformation Simulated with Parallel Calculation Using a PC Cluster	312
<i>Christelle Philippe, Alexis Coppalle</i>	

A Mesoscale Study of Large Industrial Emission Impact over Madrid Mesoscale Domain by Using MM5-CMAQ Modelling System	320
<i>Roberto San José García, Juan Luis Pérez Camaño, Raul Priego, and Rosa M. González Barras</i>	

Study of the Pollution Exchange between Bulgaria and Northern Greece . .	328
<i>Christos Zerefos, Dimiter Syrakov, Kostadin Ganev, Alexandros Vasaras, Kostas Kourtidis, Maria Tzortziou, Maria Prodanova, Reneta Dimitrova, Dimiter Yordanov, and Nikolai Miloshev</i>	

Studying High Ozone Levels in Bulgaria and Europe	337
<i>Zahari Zlatev and Dimiter Syrakov</i>	

VI Large Scale Computation for Engineering Problems

Collocation Methods for Boundary Value Problems with an Essential Singularity	347
<i>Winfried Auzinger, Othmar Koch, and Ewa Weinmüller</i>	

Boundary Integral Method for Deformable Interfaces in the Presence of Insoluble Surfactants	355
<i>Ivan B. Bazhlekov, Patrick D. Anderson, and Han E.H. Meijer</i>	

Large Eddy Simulation of Turbulent Square Channel Flow Using a PC-Cluster Architecture	363
<i>Jordan Denev, Thomas Frank, and Klaus Pachler</i>	

Adaptive Grid Refinement for Computation of the Homogenized Elasticity Tensor	371
<i>Ronald H.W. Hoppe, Svetozara I. Petrova, and Yuri V. Vassilevski</i>	

Multigrid Preconditioned Solvers for Some Elastoplastic Problems	379
<i>Johanna Kienesberger</i>	

The Free Transmission Problem for a Water Droplet	387
<i>Dirk Langemann</i>	

Numerical Simulation of the Flow in Magnetic Fluid Rotary Shaft Seals . .	396
<i>Teodora Mitkova and Lutz Tobiska</i>	

Phase-Field Method for 2D Dendritic Growth	404
<i>Vladimir Slavov, Stefka Dimova, and Oleg Iliev</i>	

Design of 2-D FIR Digital Filters Using a Parallel Machine	412
<i>Felicja Wysocka-Schillak</i>	

VII Contributed Talks

Parallel Performance Comparison of Three Direct Separable Elliptic Solvers	421
<i>Gergana Bencheva</i>	
Finite Volume Difference Methods for Convection-Dominated Problems with Interface	429
<i>Iliya A. Brayonov and Lubin G. Vulkov</i>	
Parameter Estimations in Nonlinear Parabolic Systems with Time Delay ..	438
<i>Gabriel Dimitriu and Cristina Dascălu</i>	
Systolic Architecture of Adaptive Post Detection Integration CFAR Processor in Binomial Distribution Pulse Jamming	448
<i>Ivan Garvanov, Christo Kabakchiev, and Plamen Daskalov</i>	
Immersed-Boundary Level Set Approach for Numerical Solution of Elliptic Interface Problems	456
<i>Juri D. Kandilarov</i>	
Generalized Nonstandard Numerical Methods for Nonlinear Advection-Diffusion-Reaction Equations	465
<i>Hristo V. Kojouharov and Bruno D. Welfert</i>	
On the Computation of Blow-Up Solutions of Elliptic Equations with Semilinear Dynamical Boundary Conditions	473
<i>Miglena N. Koleva</i>	
A Method for Solving Hermitian Pentadiagonal Block Circulant Systems of Linear Equations	481
<i>Borislav V. Minchev and Ivan G. Ivanov</i>	
Author Index	489

Large-Scale Scientific Computing

4th International Conference, LSSC 2003, Sozopol,

Bulgaria, June 4-8, 2003, Revised Papers

Lirkov, I.; Margenov, S.; Wasniewski, J.; Plamen, Y. (Eds.)

2004, XI, 490 p., Softcover

ISBN: 978-3-540-21090-0