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Preface

The 5th International Conference on Large-Scale Scientific Computations (LSSC 2005) was held in Sozopol, Bulgaria, June 6–10, 2003. The conference was organized and sponsored by the Institute for Parallel Processing at the Bulgarian Academy of Sciences. Partial support was also provided from project BIS-21++ funded by the European Commission in FP6 INCO via grant 016639/2005.

The plenary invited speakers and lectures were:

- O. Axelsson, Eigenvalue Estimates for Preconditioned Saddle Point Matrices
- R. Blaheta, Algebraic Multilevel Methods with Aggregations
- S. Brenner, Additive Multigrid Theory
- C. Carstensen, Review on the Convergence of Adaptive Finite Element Methods
- S. Heinrich, Numerical Analysis on a Quantum Computer
- U. Langer, Inexact Date-Sparse Boundary and Finite Element Domain Decomposition Methods
- R. Lazarov, Discontinuous Galerkin Method as Stabilization Technique for Nonconforming Finite Element Approximations of PDEs
- J. Waśniewski, New Data Storage Formats for Dense Matrices Lead to Variety of High-Performance Algorithms
- Z. Zlatev, Parallel Treatment of General Sparse Matrices

The success of the conference and the present volume in particular are the outcome of the joint efforts of many colleagues from various institutions and organizations. Firstly thanks to all the members of the Scientific Committee for their valuable contribution forming the scientific face of the conference, as well as for their help in reviewing contributed papers. We especially thank the organizers of the special sessions. We are also grateful to the staff involved in the local organization.

Traditionally, the purpose of the conference is to bring together scientists working with large-scale computational models of environmental and industrial problems, and specialists in the field of numerical methods and algorithms for modern high-speed computers. The key lectures reviewed some of the advanced achievements in the field of numerical methods and their efficient applications. The conference lectures were presented by the university researchers and practical industry engineers including applied mathematicians, numerical analysts and computer experts. The general theme for LSSC 2005 was large-scale scientific computing with a particular focus on the organized special sessions.
Special sessions and organizers were the following:

- Multiscale and Multiphysics Computations — P. Bochev, R. Hoppe, R. Lazarov
- Robust Algebraic Multigrid and Hierarchical Preconditioning Methods — R. Blaheta, U. Langer, S. Margenov
- Control/Uncertain Systems and Validated Numerics — N. Dimitrova, M. Krastanov, V. Veliov
- Operator Splittings, Their Application and Realization — I. Faragó
- Environmental Modelling — A. Ebel, K. Georgiev, Z. Zlatev
- Large-Scale Computation of Engineering Problems — P. Minev, O. Iliev
- Numerical Methods for the Schrödinger Equation and Application — H. Kosina
- Advances in Computational Mechanics — S. Brenner, C. Carstensen

Special events comprised:

- “Bulgarian Involvement in European Grid Initiatives” — presentation and discussion
- Grid Help Desk and Demos

More than 120 participants from all over the world attended the conference representing some of the strongest research groups in the field of advanced large-scale scientific computing. This volume contains 80 papers submitted by authors from over 20 countries.

The 6th International Conference, LSSC 2007, will be organized in June 2007.

November 2005

Ivan Lirkov
Svetozar Margenov
Jerzy Waśniewski
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