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Large-Scale Scientific Computing

6th International Conference, LSSC 2007
Sozopol, Bulgaria, June 5-9, 2007
Revised Papers

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Preface

The 6th International Conference on Large-Scale Scientific Computations (LSSC 2007) was held in Sozopol, Bulgaria, June 5–9, 2007. The conference was organized by the Institute for Parallel Processing at the Bulgarian Academy of Sciences in cooperation with SIAM (Society for Industrial and Applied Mathematics). Partial support was also provided from project BIS-21++ funded by the European Commission in FP6 INCO via grant 016639/2005.

The conference was devoted to the 60th anniversary of Richard E. Ewing. Professor Ewing was awarded the medal of the Bulgarian Academy of Sciences for his contributions to the Bulgarian mathematical community and to the Academy of Sciences. His career spanned 33 years, primarily in academia, but also included industry. Since 1992 he worked at Texas A&M University being Dean of Science and Vice President of Research, as well as director of the Institute for Scientific Computation (ISC), which he founded in 1992. Professor Ewing is internationally well known with his contributions in applied mathematics, mathematical modeling, and large-scale scientific computations. He inspired a generation of researchers with creative enthusiasm for doing science on scientific computations. The preparatory work on this volume was almost done when the sad news came to us: Richard E. Ewing passed away on December 5, 2007 of an apparent heart attack while driving home from the office.

Plenary Invited Speakers and Lectures:

- O. Axelsson, Mesh-Independent Superlinear PCG Rates for Elliptic Problems
- R. Ewing, Mathematical Modeling and Scientific Computation in Energy and Environmental Applications
- L. Grüne, Numerical Optimization-Based Stabilization: From Hamilton-Jacobi-Bellman PDEs to Receding Horizon Control
- M. Gunzburger, Bridging Methods for Coupling Atomistic and Continuum Models
- B. Philippe, Domain Decomposition and Convergence of GMRES
- P. Vassilevski, Exact de Rham Sequences of Finite Element Spaces on Agglomerated Elements
- Z. Zlatev, Parallelization of Data Assimilation Modules

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. First, 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 2007 was “Large-Scale Scientific Computing” with a particular focus on the organized special sessions.

Special Sessions and Organizers:

- Robust Multilevel and Hierarchical Preconditioning Methods — J. Kraus, S. Margenov, M. Neytcheva
- Domain Decomposition Methods — U. Langer
- Monte Carlo: Tools, Applications, Distributed Computing — I. Dimov, H. Kosina, M. Nedjalkov
- Operator Splittings, Their Application and Realization — I. Farago
- Large-Scale Computations in Coupled Engineering Phenomena with Multiple Scales — R. Ewing, O. Iliev, R. Lazarov
- Advances in Optimization, Control and Reduced Order Modeling — P. Bochev, M. Gunzburger
- Control Systems — M. Krastanov, V. Veliov
- Environmental Modelling — A. Ebel, K. Georgiev, Z. Zlatev
- Computational Grid and Large-Scale Problems — T. Gurov, A. Karaivanova, K. Skala
- Application of Metaheuristics to Large-Scale Problems — E. Alba, S. Fidanova

More than 150 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 86 papers submitted by authors from over 20 countries.

The 7th International Conference LSSC 2009 will be organized in June 2009.

December 2007

Ivan Lirkov
Svetozar Margenov
Jerzy Waśniewski

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