Computational Science and High Performance Computing IV

The 4th Russian-German Advanced Research Workshop, Freiburg, Germany, October 12 to 16, 2009

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Springer

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ISBN 978-3-642-17769-9 e-ISBN 978-3-642-17770-5

DOI 10.1007/978-3-642-17770-5

Notes on Numerical Fluid Mechanics
and Multidisciplinary Design ISSN 1612-2909

Typeset & Cover Design: Scientific Publishing Services Pvt. Ltd., Chennai, India.

Printed on acid-free paper

5 4 3 2 1 0

springer.com

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Preface

This volume is published as the proceedings of the fourth Russian-German Advanced Research Workshop on Computational Science and High Performance Computing in Freiburg, Germany, in October 2009.

The contributions of these proceedings were provided and edited by the authors, chosen after a careful selection and reviewing.

The workshop was organized by the High Performance Computing Center Stuttgart (Stuttgart, Germany), the Institute of Computational Technologies of the Siberian Branch of the Russian Academy of Sciences (Novosibirsk, Russia) and the Section of Applied Mathematics of the University of Freiburg (Freiburg, Germany) in the framework of activities of the German-Russian Center for Computational Technologies and High Performance Computing.

The current event is the continuation of the good tradition for German and Russian scientists of holding such a workshop biannually, alternating host countries: Russia and Germany. The first workshop took place in September 2003 in Novosibirsk and was hosted by the Institute of Computational Technologies SB RAS. The second workshop was hosted by the High Performance Computing Center Stuttgart in March 2005. The third workshop was held in July 2007, again in Novosibirk, also hosted by the Institute of Computational Technologies SB RAS. The current fourth workshop was hosted by the Section of Applied Mathematics of the University of Freiburg in Freiburg.

All workshops gave the possibility of sharing and discussing the latest results and developing further scientific contacts in the field of computational science and high performance computing.

The topics of the current workshop included software and hardware for high performance computation, numerical modelling in geophysics and computational fluid dynamics, mathematical modelling of tsunami waves, simulation of fibrous composites, simulation of reacting flows, numerical modelling in electromagnetics and medicine and numerical analysis. The highlight of the workshop was the special session on the shallow water modelling.

The participation of representatives of major research organizations engaged in the solution of the most complex problems of mathematical modelling, development of new algorithms, programs and key elements of information technologies,

elaboration and implementation of software and hardware for high performance computing systems, provided a high level of competence of the workshop.

The heads and leading specialists of Section of Applied Mathematics of University of Freiburg, High Performance Computing Center Stuttgart (HLRS) (University of Stuttgart), Goethe Center for Scientific Computing (G-CSC) (Goethe University Frankfurt am Main), Alfred Wegener Institute for Polar and Marine Research (Bremerhaven), University of Hamburg, Institute for Technical Thermodynamics (Karlsruhe Institute of Technology), Copf-Bionic GmbH (Ludwigsburg), Institute of Numerical Simulation (Hamburg University of Technology), Institute for Computational Modeling in Civil Engineering (Technical University of Braunschweig), Institute of Aerodynamics (RWTH Aachen), LASSO Ingenieurgesellschaft mbH (Leinfelden-Echterdingen), Department of Mathematics and Computer Science (Free University of Berlin) participated in the workshop from German side.

From Russian side the heads and leading specialists of Institute of Computational Technologies SB RAS (Novosibirsk), Kutateladze Institute of Thermophysics SB RAS (Novosibirsk), Lavrentiev Institute of Hydrodynamics SB RAS (Novosibirsk), Institute of Computational Modelling SB RAS (Krasnoyarsk) and Krasnoyarsk State Agriculture University took part in the workshop.

This workshop continues to broaden the scientific cooperation, involving not only German and Russian colleagues. Kazakh scientists from the Al-Farabi Kazakh National University (Almaty, Kazakhstan), who have been taken part in workshops since 2005 at Prof. Yurii Shokin's suggestion, also participated in the current workshop. And, besides, the scientists from three other countries, namely, France, Israel and USA, presented their works. Therefore, the following institutions were represented: University of Savoy and University of Orléans from France, Department of Fluid Mechanics and Heat Transfer (Faculty of Engineering, Tel Aviv University), Coastal and Marine Engineering Research Institute (Technion City, Haifa). From USA: Department of Mathematics of the North Carolina State University (Raleigh), Department of Mathematics of the University of Louisiana (Lafayette, USA) and Mathematics Department of Tulane University.

We are glad to see the successful continuation and promising perspectives of the highly professional international scientific meetings, which bring together leading scientists from Germany, Russia, Kazakhstan, and now also France, Israel and USA.

The editors would like to express their gratitude to all the participants of the workshop and wish them a further successful and fruitful work.

Freiburg – Novosibirsk
July 2010

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