

Modeling, Simulation and Optimization of Complex Processes

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Hans Georg Bock • Hoang Xuan Phu
Rolf Rannacher • Johannes P. Schlöder
Editors

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Proceedings of the Fourth International
Conference on High Performance Scientific
Computing, March 2-6, 2009, Hanoi, Vietnam

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ISBN 978-3-642-25706-3 e-ISBN 978-3-642-25707-0
DOI 10.1007/978-3-642-25707-0
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: "PCN Applied for"

Math. Subj. Class. (2010): 35-06 49-06, 60-06, 65-06, 68-06, 70-06, 76-06, 86-06, 90-06, 93-06, 94-06

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Front cover figure: The Huc Bridge on Hoan Kiem Lake, Hanoi. By Courtesy of Johannes P. Schlöder.

Printed on acid-free paper

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Preface

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High Performance Scientific Computing is an interdisciplinary area that combines 2
many fields such as mathematics and computer science as well as scientific and 3
engineering applications. It is an enabling technology for both competitiveness 4
in industrialized countries and for speeding up development in emerging coun- 5
tries. High performance scientific computing develops methods for modeling, 6
computer-aided simulation, and optimization of systems and processes. In practical 7
applications in industry and commerce, science and engineering, it helps to conserve 8
resources, to avoid pollution, to reduce risks and costs, to improve product quality, 9
to shorten development times, or simply to operate systems better. Topical aspects of 10
scientific computing have been presented and discussed at the Fourth International 11
Conference on High Performance Scientific Computing held at the Institute of 12
Mathematics, Vietnam Academy of Science and Technology (VAST), March 2–6, 13
2009. The conference has been organized by the Institute of Mathematics of VAST, 14
the Interdisciplinary Center for Scientific Computing (IWR) of the University of 15
Heidelberg, and Ho Chi Minh City University of Technology. 16

More than 200 participants from countries all over the world attended the 17
conference. The scientific program consisted of more than 140 talks, 10 of 18
them were invited plenary lectures given by Robert E. Bixby (Houston), Olaf 19
Deutschmann (Karlsruhe), Iain Duff (Chilton), Roland Eils (Heidelberg), László 20
Lovász (Budapest), Peter Markowich (Cambridge & Vienna), Volker Mehrmann 21
(Berlin), Alfio Quarteroni (Lausanne & Milan), Horst Simon (Berkeley), and 22
Ya-xiang Yuan (Beijing). 23

Topics included mathematical modeling, numerical simulation, methods for 24
optimization and control, parallel computing, software development, applications 25
of scientific computing in physics, mechanics, hydrology, chemistry, biology, 26
medicine, transport, logistics, site location, communication networks, scheduling, 27
industry, business, and finance. 28

This proceedings volume contains 27 carefully selected contributions referring 29
to lectures presented at the conference. We would like to thank all authors and the 30
referees. 31

Special thanks go to the sponsors whose support significantly contributed to the success of the conference: 32
33

- + Heidelberg Graduate School of Mathematical and Computational Methods for the Sciences 34
35
- + Daimler and Benz Foundation, Ladenburg 36
- + The International Council for Industrial and Applied Mathematics (ICIAM) 37
- + Berlin Mathematical School 38
- + Berlin/Brandenburg Academy of Sciences and Humanities 39
- + The Abdus Salam International Centre for Theoretical Physics, Trieste 40
- + Institute of Mathematics, Vietnam Academy of Science and Technology 41
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