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# Mathematical Modeling and Computational Science

International Conference, MMCP 2011  
Stará Lesná, Slovakia, July 4-8, 2011  
Revised Selected Papers

 Springer

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# Preface

The international conference series Mathematical Modeling and Computational Physics (MMCP) provides an open forum enabling scientists to share ideas, to strengthen ties, and to find incentives for future scientific cooperation. The MMCP conferences are intended, on one hand, at broadening the participants' grasp of research matters by interdisciplinary contacts on hot topics, made available to the audience by leading scientists. On the other hand, they aim at encouraging young people to provide reports on high-quality original results.

Together with the permanent organizer of the MMCP conferences, the Laboratory of Information Technologies of the Joint Institute for Nuclear Research (JINR) in Dubna, the co-organizers of the sixth edition – MMCP 2011 – were the Institute of Experimental Physics, Slovak Academy of Sciences (IEP SAS), Košice, the Technical University of Košice (TU), the Pavol Jozef Šafárik University (UPJŠ) in Košice, and the Union of Slovak Mathematicians and Physicists (USMP), Košice. The Slovak colleagues took on themselves the main practical burden concerning the conference organization in the Academy congress center in Stará Lesná, Slovakia, during July 4–8, 2011. We are grateful to the staff involved in the local organization.

The coverage of MMCP 2011 included: mathematical methods and tools for modeling complex physical and technical systems; methods, software, and computer complexes for experimental data processing; methods, algorithms, and software of computer algebra; computational chemistry, biology, and biophysics; distributed scientific computing; computing tools of a new generation.

We had 72 participants from 16 countries attending the conference. Twelve plenary lectures and nearly 50 contributed talks were delivered. Most authors submitted written manuscripts for publication. The present volume collects together a number of 41 papers accepted after passing the refereeing process. These papers cover a broad range of topics. Beyond their inherent inner technicalities, there is a stress on the cross-fertilization power coming from their messages for sound approaches to the derivation of the solutions, which merge rigorous mathematical arguments with the reality of the hardware and software environments.

We found it useful to organize the volume in six chapters: plenary lectures, mathematical modeling and methods, numerical modeling and methods, computational support of the experiments, computing tools, and optimization and simulation. Within each chapter, the papers are ordered alphabetically following the name of the first/single author.

The success of the conference and the present volume are due to the joint efforts of many colleagues from various research institutions. We express our deep gratitude to all the members of the International Program Committee for their valuable contribution to the scientific spirit of the conference, as well as for their help in reviewing the submitted papers. The acceptance by independent

referees to participate in the reviewing process of some manuscripts is gratefully acknowledged.

We hope that the readers of the papers collected under the covers of this volume will find useful information for their current and future activity and will become interested in joining future MMCP conferences.

November 2011

Gheorghe Adam  
Ján Buša  
Michal Hnatič

# Organization

MMCP 2011 was organized by the Laboratory of Information Technologies, Joint Institute for Nuclear Research (LIT JINR), Dubna, Russia, the Institute of Experimental Physics, Slovak Academy of Sciences (IEP SAS), the Technical University of Košice (TU), the Pavol Jozef Šafárik University (UPJŠ), and the Union of Slovak Mathematicians and Physicists (USMP), Košice, Slovakia.

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