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Dedicated to

Prof. Vladimir P. Gerdt

on the occasion of his 60th birthday

Preface

The outstanding feature of this CASC Workshop is that this is the tenth workshop in the series started in 1998. The general idea of this workshop was to bring together people working in the areas of computer algebra systems(CASs), computer algebra methods and algorithms, and various CA applications in natural sciences and engineering.

The nine earlier CASC conferences, CASC 1998, CASC 1999, CASC 2000, CASC 2001, CASC 2002, CASC 2003, CASC 2004, CASC 2005, and CASC 2006, were held, respectively, in St. Petersburg, Russia, in Munich, Germany, in Samarkand, Uzbekistan, in Konstanz, Germany, in Crimea, Ukraine, in Passau, Germany, in St. Petersburg, Russia, in Kalamata, Greece, and in Chişinău, Moldova, and they proved to be successful.

Since 1998, the topics of papers published in the CASC proceedings accounted both for the development of new excellent computer algebra systems and for expanding the scopes of application of CA methods and techniques. The present volume of the proceedings of CASC 2007 continues this tradition. Among the traditional topics, there are studies in polynomial and matrix algebra, quantifier elimination, and Gröbner bases.

One of the fruitful areas of the application of CA methods and systems is the derivation of new analytic solutions to differential equations, and several papers deal with this topic.

The application of CASs to stability investigation of both differential equations and difference methods for them is also the subject of a number of papers.

Several papers are devoted to the application of computer algebra methods and algorithms to the derivation of new mathematical models in biology and in mathematical physics.

In addition to the accepted submissions, this volume also includes two invited papers. The paper by F. Winkler and E. Shemyakova (RISC, Linz) addresses the theme of extending the range of analytically solvable PDEs with the aid of symbolic and algebraic methods. The key technique used here is the factorization of a differential operator. The authors have introduced the notion of *obstacle* for the factorization of a differential operator, i.e., conditions preventing a given operator from being factorizable.

The other invited lecture, by S. Fritzsche (Max-Planck Institute for Nuclear Physics, Heidelberg), is devoted to the problem of exploring decoherence and entanglement phenomena in quantum information theory. The author presents his Maple-based FEYNMAN program, which was developed recently to support the investigation of the above phenomena. One of the applications presented is the atomic photoionization, where the author shows how the polarization can be transferred from the incoming photons to the emitted photoelectrons, giving

rise to a (spin-spin) entanglement between the photoelectron and the remaining (photo-)ion.

All the papers contained in this volume were accepted by the Program Committee after a thorough reviewing process.

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July 2007

V.G. Ganzha
E.W. Mayr
E.V. Vorozhtsov

Organization

CASC 2007 was organized jointly by the Department of Informatics at the Technische Universität München, Germany, the Department of Computer Security at the Bonn-Aachen International Center for Information Technology, Bonn, Germany and the Department of Computer Science, Universität Bonn, Germany.

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Table of Contents