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Foreword

Guest Editors' foreword

The International Symposium on Symbolic and Algebraic Computation, ISSAC, is the premier conference spanning all areas of research in symbolic mathematical computation. This series, now held annually, began in 1966 with the ACM Symposium on Symbolic and Algebraic Computation, SYMSAC, held in Washington D.C. Subsequent North American and European meetings followed, and the series has been operating under the ISSAC names since 1988.

ISSAC 2010, held at the Technische Universität München, was the 35^{th} meeting of the series. The conference featured three invited talks, 45 contributed papers and tutorials. The invited talks were given by three noted experts in fields of wide-ranging interest: *Algebraic Invariants and their Differential Algebra* by Evelyne Hubert, *Verification Methods: Rigorous Results using Floating-Point Arithmetic* by Siegfried Rump and *Theory of Reals For Verification and Synthesis of Hybrid Dynamical Systems* by Ashish Tiwari. The contributed papers were chosen by the conference program committee from 110 submissions.

This issue of the *Journal* collects six articles for which earlier versions were presented at the ISSAC 2010 conference. These articles are enhanced versions of those presented at ISSAC, submitted in response to a post-conference call for papers and all have been refereed specifically for this issue. About half of the articles submitted for the issue were not selected, usually for lack of sufficient clarity, originality or significance of the results.

The papers selected for this issue represent a cross-section of the topics seen in modern ISSAC meeting, showing the broad range of symbolic computation, including mathematical algorithms, complexity results and software research.

- The paper by Chen, Davenport, May, Moreno Maza, Xia and Xiao takes the notions of regular chains and triangular decomposition, normally applied to complex systems, and adapt them to the real case, showing how to decompose semi-algebraic systems.
- The contribution of Kapur, Sun and Wang presents an algorithm to compute a comprehensive Groebner system of a parametric ideal. This method improves upon the work of Suzuki, Sato and Nabeshima, reducing the number of branches to produce CGS with several desirable properties.
- The article by Barkatou, El Bacha, Labahn and Pflügel gives two new algorithms for reducing systems of higher order linear differential equations with power series coefficients to equivalent simpler systems. Instead of Hermite forms, which often contain differential equations of higher order, two-sided block Popov forms are used.
- The paper of Abramov and Ryabenko considers q-difference equations with polynomial coefficients depending on a parameter and how to find values of the parameter that lead to rational function solutions. This is used in q-summation algorithms, including q-accurate summation and q-Zeilberger algorithms.
- The article by Mayr and Ritscher presents new bounds on the complexity of computing reduced Groebner bases in terms of the dimension and number of variables of the polynomial ideal.
- The paper by Linton, Hammond, Konovalov, Brown, Trinder, Loidl, Horn and Roozemond presents protocols and programming interfaces that allow software components based on different

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computer algebra systems to be combined to solve problems that no single system can solve. These combinations may be organized in a number of ways, including as distributed systems on computer clusters.

Together, these articles present a nice snapshot of symbolic computation seen through the eyes of the ISSAC community.

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