Foreword

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This special issue of Mathematics in Computer Science (MCS) is a follow-up to the successful Third International Conference on Mathematical Aspects of Computer and Information Sciences (MACIS 2009), which was held jointly with the Ninth Asian Symposium on Computer Mathematics (ASCM 2009) in Fukuoka, Japan, on December 14–17, 2009. Original research papers, in particular those which substantially extend ideas and results presented at MACIS 2009, were solicited. Topics of interest for the special issue include:

- Polynomial System Solving (Complex/Real/Rational)
- System and Control (Control theory/Bio-inspired system)
- Software Science (Synthesis/Language/Framework)

These topics were also covered by MACIS 2009.

The special issue consists of six papers, which we will introduce briefly below. All the papers contain original work not published elsewhere and they have been refereed according to the standards of MCS. The refereeing for the two papers coauthored by the guest editor of this special issue was handled by Professor Masaaki Kanno (from Niigata University, Japan) under the arrangement of the MCS managing editor. I would like to express my gratitude to Professor Kanno for his editorial effort and kind help.

The paper by Xiaoliang Li, Chenqi Mou, Wei Niu and Dongming Wang studies stability analysis of biological networks modeled as discrete and finite dynamical systems. Many techniques from polynomial system solving such as Gröbner bases, discriminant varieties, and quantifier elimination are well exploited for the purpose.

The paper by Mbarka Mabrouki, Marc Aiguier, Jean-Paul Comet, Pascale Le Gall and Adrien Richard deals with deriving conditions under which properties established from the analysis of a biological regulatory network, formalized using a multi-valued discrete approach, are preserved when the system is embedded in a larger one.

The paper by François Boulrier, Marc Lefranc, François Lemaire, and Pierre-Emmanuel Morant provides a systematic model-reduction method for chemical reaction systems using a differential elimination method, which can also deal with the conservation laws.

The paper by Hiroyuki Ichihara and Hirokazu Anai considers the problem of minimizing a nonlinear gain function in the input-to-state stability framework for nonlinear dynamical systems. The method used is a combination of the sum-of-squares technique and the quantifier-elimination technique.

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The paper by Hidenao Iwane, Hitoshi Yanami and Hirokazu Anai investigates symbolic-numeric hybrid methods for multi-objective optimization (MOO) problems. The methods are successfully applied to solve MOO problems derived from some real engineering fields.

The paper by Gabriel Dos Reis and Bjarne Stroustrup presents a method for representing C++ programs that is useful to compiler or source code analysis tools. The paper also explains why C++ is a challenging language to be represented and why the authors' representation is useful.

Finally I would like to thank the authors, the numerous referees who anonymously served the scientific community with great competence and dedication, and the managing editor of MCS, Professor Dongming Wang, for all his support.