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Formal Modeling and Analysis of Timed Systems

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Preface

This volume contains the papers presented at the 7th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2009), held during 14–16 September in Budapest, Hungary.

Timing aspects of systems from a variety of computer science domains have been treated independently by different communities. Researchers interested in semantics, verification and performance analysis study models such as timed automata and timed Petri nets, the digital design community focuses on propagation and switching delays, while designers of embedded controllers have to take account of the time taken by controllers to compute their responses after sampling the environment. Timing-related questions in these separate disciplines do have their particularities. However, there is a growing awareness that there are basic problems that are common to all of them. In particular, all these subdisciplines treat systems whose behavior depends on combinations of logical and temporal constraints; namely, constraints on the temporal distances between occurrences of events.

The aim of FORMATS is to promote the study of fundamental and practical aspects of timed systems, and to bring together researchers from different disciplines that share interests in the modelling and analysis of timed systems. Typical topics include (but are not limited to):

- *Foundations and Semantics.* Theoretical foundations of timed systems and languages; comparison between different models (timed automata, timed Petri nets, hybrid automata, timed process algebra, max-plus algebra, probabilistic models).
- *Methods and Tools.* Techniques, algorithms, data structures, and software tools for analyzing timed systems and resolving temporal constraints (scheduling, worst-case execution time analysis, optimization, model checking, testing, constraint solving, etc.).
- *Applications.* Adaptation and specialization of timing technology in application domains in which timing plays an important role (real-time software, hardware circuits, and problems of scheduling in manufacturing and telecommunication).

As was the case last year, FORMATS was co-located with the International Conference on Quantitative Evaluation of SysTems (QEST), and the two conferences shared invited speakers and some social events. Whereas FORMATS focuses on fundamental and practical aspects of timed systems, QEST focuses on evaluation and verification of computer systems and networks, through stochastic models and measurements. In the design of computing-based systems one often has to deal with both timing and stochastic features. Theoretically the combination of these aspects is challenging and we are happy to see three papers in this volume that tackle this issue. We wish to thank the QEST organizers, in

particular Miklós Telek, Michael Huth and David Nicol, for the pleasant cooperation.

This year FORMATS received 40 full submissions by authors coming from 21 countries. Each submission was reviewed by at least three Programme Committee members. The committee selected 18 submissions for publication and presentation at the conference. In addition, the conference included invited talks by:

- Jan Beutel, ETH Zurich, Switzerland
  Research Challenges in Wireless Sensor Networks
- Nikolaj Bjørner, Microsoft Research, USA
  Tapas: Theory Combinations and Practical Applications
- Stéphane Gaubert, INRIA Saclay – Île-de-France and CMAP, École Polytechnique, France
  Max-plus Algebraic Tools for Discrete Event Systems, Static Analysis, and Zero-Sum Games
- George Pappas, University of Pennsylvania, USA
  Approximations of Discrete, Continuous, and Hybrid Systems

We thank the invited speakers for accepting our invitation and for providing extended abstracts of their talks for inclusion in this proceedings volume. We wish to thank the Programme Committee members and the other reviewers for their competent and timely reviews of the submissions. During the selection process and while preparing this volume, we used the EasyChair conference management system, which provided excellent support and allowed us to concentrate fully on the scientific content. Finally, we gratefully acknowledge financial support by the EU IST project Quantitative System Properties in Model-Driven-Design of Embedded Systems (QUASIMODO).

July 2009

Joël Ouaknine
Frits Vaandrager

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Table of Contents