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Hybrid Systems III

Verification and Control

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Preface

This volume contains the proceedings of the DIMACS/SYCON *Workshop on Verification and Control of Hybrid Systems*, organized October 22–25, 1995, at Rutgers University in New Brunswick, New Jersey. The workshop was part of the DIMACS 1995–96 Special Year on Logic and Algorithms. DIMACS is a Science and Technology Center, funded by the National Science Foundation, whose participating institutions are Rutgers University, Princeton University, AT&T Bell Laboratories, and Bellcore. SYCON is a Rutgers University Center dedicated to research in control theory and closely associated topics.

The workshop was the fifth in an annual series of workshops on hybrid systems. The previous workshops of the series were organized in 1991 and 1994 in Ithaca, New York, in 1992 in Lyngby, Denmark, and in 1993 in Boston, Massachusetts. The proceedings of these workshops were published in the Springer-Verlag Lecture Notes in Computer Science series, volumes 736 and 999.

The focus of the workshop was on mathematical methods for the rigorous and systematic design and analysis of hybrid systems. A hybrid system consists of digital devices that interact with analog environments. Driven by rapid advances in digital controller technology, hybrid systems are objects of investigation of increasing relevance and importance. The emerging area of hybrid systems research lies at the crossroads of computer science and control theory: computer science contributes expertise on the digital aspects of a hybrid system, and control theory contributes expertise on the analog aspects. Since both research communities speak largely different languages, and employ largely different methods, it was the purpose of the workshop to bring together researchers from both computer science and control theory. The workshop succeeded in this goal by attracting a registered audience of 125 researchers from both communities.

The four-day workshop featured 4 invited keynote speakers, 6 invited panelists, 32 talks by invited participants, and 24 talks that were selected by the program committee from 47 submissions. The keynote talks were "A game-theoretic approach to hybrid system design" by Shankar Sastry (University of California at Berkeley), "Hybrid systems: the computer science view" by Amir Pnueli (Weizmann Institute of Science), "Stabilization of device networks using hybrid commands" by Roger Brockett (Harvard University), and "Modeling and verification of automated transit systems, using timed automata, invariants, and simulations" by Nancy Lynch (MIT). The panelists Robert Kurshan (AT&T Bell Laboratories), Anil Nerode (Cornell University), Mike Reed (Oxford University), Joseph Sifakis (VERIMAG Grenoble), Jan van Schuppen (CWI), and Pravin Varaiya (University of California at Berkeley) discussed the topic "Hybrid systems research: achievements, problems, and goals."

We are grateful to all invitees and contributors for making the workshop a success. In addition, we wish to thank the DIMACS staff, especially Pat Toci and Barbara Kaplan, for administrating the workshop organization; the DIMACS management, Andràs Hajnal and Stephen Mahaney, and the organizing

committee for the DIMACS Special Year on Logic and Algorithms, Eric Allender, Robert Kurshan, and Moshe Vardi, for their generous sponsorship; Anil Nerode for organizational advice; and the program committee members Albert Benveniste (INRIA-IRISA Rennes), John Guckenheimer (Cornell University), Bruce Krogh (Carnegie Mellon University), Amir Pnueli (Weizmann Institute of Science), Peter Ramadge (Princeton University), Shankar Sastry (University of California at Berkeley), Fred Schneider (Cornell University), Hector Sussmann (Rutgers University), and Joseph Sifakis (VERIMAG Grenoble) for assisting in the selection process.

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