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Introduction to the Special Issue on Specification Analysis and Verification of Reactive Systems

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This special issue is inspired by the homonymous ICLP workshops that took place during ICLP 2001 and ICLP 2002. Extending and shifting slightly from the scope of their predecessors (on verification and logic languages) held in the context of previous editions of ICLP, the aim of the SAVE workshops was to bring together researchers interested in the use of computational logic as a tool for the specification, the analysis and the validation of systems, with particular emphasis on emerging technologies such as World Wide Web and E-Commerce, (protocols for) Smart Cards and Mobile Telephony, Wireless Technology, Hybrid Systems, Real-Time and Distributed systems, etc.

The huge increase in interconnectivity we have witnessed in the last decade has boosted the development of systems which are often large-scale, distributed, time-critical, and possibly acting in an unreliable or malicious environments. Furthermore, software and hardware components are often mobile, and have to interact with a potentially arbitrary number of other entities. These systems require solid formal techniques for their specification, analysis and verification. In this respect, computational logic plays an increasingly important role. Concerning the specification aspect, one can think for instance at the specification, in temporal logic, of a communication protocol. Such specification offers the advantage that one can reason about it using formal methods, and at the same time, it is often easily executable by rewriting it into a logic-based programming language. In addition, Computational logic plays a fundamental role by providing formal methods for proving system correctness and

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tools (e.g. using techniques like constraint programming and theorem proving) for verifying their properties.

This special issue presents a collection of papers that reflect different research directions in this field. Following an open call, we received 12 submissions, out of which we selected four papers. According to the goals of the two SAVE workshops, the topics presented in the selected papers range from foundational studies on verification techniques (for infinite-state, concurrent and timed systems) to practical applications (protocol verification).

In more detail, the paper "Equivalence-Checking on Infinite-State Systems: Techniques and Results" by Antonin Kucera and Petr Jancar presents an interesting survey on techniques developed for checking the equivalence of different computational models with an infinite set of possible reachable configurations.

"Automatic Verification of Timed Concurrent Constraint Programs" by Moreno Falaschi and Alicia Villanueva presents automated verification techniques for a timed version of concurrent programs in which constraint operations are used as a communication mechanism.

Timed systems are also studied in "State Space Computation and Analysis of Time Petri Nets" by Guillaume Gardey, Olivier F. Roux and Olivier H. Roux. Here the focus is on the analysis of a timed extension of Petri Nets.

As an integration to the techniques presented in the other three papers, in "Parametric Verification of a Group Membership Algorithm", Ahmed Bouajjani and Agathe Merceron present an interesting application of verification techniques to the analysis of a Group Membership protocol.

We would like to thank the authors for their high quality contributions and the reviewers for their great work. Finally, we would like to thank the *TPLP* Editor, Professor Maurice Bruynooghe, for the support and help in creating this special issue.

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