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Special Issue on Application of Concurrency to System Design

The articles in this special issue of Fundamenta Informaticae are revised versions of selected papers presented in the Third International Conference on Application of Concurrency to System Design (ACSD'03) held in Guimarães, Portugal, 18-20 June, 2003. The first conference in the series was held in Aizu-Wakamatsu, Japan, March 1998, the second in Newcastle upon Tyne, U.K., June 2001. The journal versions of six selected papers from ACSD'01 were published in *Fundamenta Informaticae, Vol. 50, Number 2, April 2002*.

The five papers have been chosen from 22 contributions accepted for presentation at ACSD'03, following their additional evaluation and editorial treatment.

Like its predecessors, the Guimarães Conference was organized to provide a forum for disseminating advanced research results on theory, algorithms, and case studies arising in the design of concurrent systems.

The chosen articles cover complexity issues, asynchronous circuits, reactive syatems, scheduling, refinement and synthesis problems. The order of contributions is alphabetical.

The first article by Y. Bontemps, P.-Y. Schobbens and C. Löding is devoted to synthesis of open reactive systems. They start with scenario-based specifications and propose Live Sequence Charts with a new, game-based, semantics to model interactions between the system and its environment.

In the second article, J. Cortadella, A. Kondratyev, L. Lavagno, A. Taubin, Y. Watanabe address the problem of quasi-static scheduling for concurrent architectures. Their paper presents a synthesis approach for reactive syatems that aims at minimizing the overhead introduced by the operating system and the interaction among the concurrent tasks, while considering multiple concurrent execution resources.

In the third article, J. Esparza provides a surprising polynomial-time algoritnm for checking consitency of free-choice singal transition graphs.

The fourth article by V. Khomenko, M. Koutny and A. Yakovlev addresses the problem of detecting state encoding conflicts in Signal Transition Graphs. The problem is proven to be NP-complete. The authors propose an algorithm based on the Boolean Satisfiability (SAT) approach. The SAT problem is of course also NP-complete, but there exist many heuristic efficient algorithms for SAT working very well for "average" case.

In the fifth article and the last, J.-P. Talpin, P. Le Gueric, S. K. Shukla, F. Doucet, and R. Gupta proposes a new approach to formal refinement-checking. They apply the concept of multi-clock synchrony, and demonstrate the effectiveness of the approach by experimental and comparative study of a SPECC programming example.

I am very grateful to the authors for submitting their papers and to the referees for their useful criticism.

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