EMSOFT 2009 guest editors' introduction

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We are delighted to present two of the best papers from EMSOFT 2009. The first paper “Modular Static Scheduling of Synchronous Data-flow Networks: An Efficient Symbolic Representation” by Marc Pouzet and Pascal Raymond studies the problem of producing modular sequential imperative code from synchronous data-flow networks. In particular, the main problem is that of decomposing a system with several input and output flows into a minimal number of classes, such that they can be statically scheduled and atomically executed without restricting possible feedback loops between the input and the output. This problem arises in the context of synchronous languages such as Lustre and Scade and also in modeling tools such as Simulink. The main result of the paper is that although this general problem is intractable, real-life programs do not exhibit such complexity. In fact they are amenable to polynomial-time solutions using a new symbolic encoding scheme proposed in the paper.

The second paper, entitled “Analytic Real-Time Analysis and Timed Automata: A Hybrid Methodology for the Performance Analysis of Embedded Real-Time Systems” by Kai Lampka, Simon Perathoner, and Lothar Thiele proposes compositional techniques for analyzing real-time systems. The modeling technique studied in this paper relies on modeling certain components of a system using Real-Time Calculus and the others using Timed Automata. The main result is a composition technique for combining the results of analyzing these two different models. The advantage of such a “hybrid” modeling and analysis technique is that it might avoid the common state space explosion problem that is encountered when the entire system is modeled with state-based models such as Timed Automata.

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We hope that you will enjoy both these papers which represent a snapshot of the state-of-the-art in research on embedded software.

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