Editorial

Special issue: Best papers of RTS'2005

This special issue is comprised of six papers selected from the 13th International Conference on Real-Time Systems (RTS'2005), held in Paris, 5–6 April 2005 within the context of the Embedded Systems 2005 trade show. This edition of RTS was particularly successful both in terms of submissions, with an increase of 120% over the previous year, and in terms of the number of attendees.

The papers in this special issue are organized as follows. Gamatié et al. in the first paper address the design of avionic applications through model refinement. The functional specification is done using the synchronous language Lustre, then successive transformations are applied to this description so as to come up with an operational architecture which is "correct by construction".

The following 5 papers present advances in the field of real-time scheduling. Fisher and Baruah propose a novel fully polynomial-time approximation scheme for feasibility analysis in static-priority systems. As pointed out by the authors, this approximate feasibility test, whose level of accuracy may be chosen as high as needed, can be useful for quickly estimating feasibility, for instance, in the context of an automatic system synthesis tool.

The next paper, by Ridouard et al, presents several results on the scheduling of tasks with self-suspensions, for instance, tasks using remote operations that are executed upon dedicated processors. In particular, the authors show that this problem is NP-hard in the strong sense and that scheduling anomalies (i.e. reducing computational requirements may lead to unfeasibility) can occur at run-time under Earliest Deadline First.

Automatic memory reclamation through a garbage collector has some obvious advantages even in the context of real-time systems. In particular, it simplifies programming and prevents memory leaks and dangling pointers that could lead to a system crash. The paper by Van Assche et al studies the problem of scheduling a set of hard real-time tasks jointly with a garbage collector. The method considers the garbage collector as an aperiodic task and executes it through a polling server. A schedulability test, considering both time and memory issues, is proposed for the case of Fixed Priority Preemptive (FPP) scheduling.

The next paper studies a non-preemptive scheduling scheme, called FP/DP, that combines fixed priorities and dynamic priorities. Precisely, the primary scheduling parameter is the static priority that reflects the importance while the secondary scheduling parameter is the dynamic priority. The proposal is shown to have benefits over standard Non-Preemptive Fixed Priority scheduling particularly in terms of feasibility. This work finds potential applications in the context of Quality of Service architecture such as DiffServ.

Last but not least, Schioler et al show a promising application of Network Calculus for the performance analysis of distributed real-time systems with tasks having cyclic and acyclic dependencies. Their proposal, implemented in Mathlab/Simulink, proves to be competitive with respect to model checking in timed automata. This study will enable us to gain more insight into the extent to which Network Calculus can be used to solve real-time scheduling problems.

We would like to thank the authors for their contributions to this special issue and the Editor-in-Chief Prof. Laurence T. Yang for his support. We would also like to thank once again everyone who was involved in making RTS'2005 a success. In particular, we would like to thank the program committee members for their help in selecting the papers for this issue and especially the referees of the extended versions of the selected papers for their evaluations.

The upcoming 14th edition of RTS will be held in Poitiers (France) in May 2006 and has been renamed to Real-time and Network Systems (RTNS'2006) to emphasise the networking issues. Let us hope for a bright future in the RTNS conference series!

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