
Editorial

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Biographical notes: Nihal Pekergin received her PhD in Computer Science from the Université Paris Descartes in 1991. She is currently a Professor at the Université Paris-Est Créteil (UPEC). Her research interests include quantitative verification and performance evaluation of discrete-event systems. She served on PCs and as a PC Chair for numerous international workshops and conferences. She was the Guest Editor of *Computer Journal* and steering committee member of the International Workshop on Verification and Evaluation of Computer and Communication Systems (VECoS).

Tayssir Touili received her PhD in Computer Science from Université Paris 7 in 2003. Her thesis was about regular model checking and its application for the analysis of parameterised systems and multi-threaded programs. In 2003/2004, she spent one year as a researcher in Carnegie Mellon University, Pittsburgh, USA. Since 2004, she holds a CNRS research position in LIAFA, Paris. Her main research interest is regular model checking and its applications to software verification. She participated to the development of several tools for software model checking. These tools allow to find real bugs in industrial programs such as a piece of a robot controller and a Windows Bluetooth driver. She has several publications in high-quality conferences and journals.

This issue entitled ‘Verification, control and performance analysis’ is devoted to extended versions of selected contributions from the technical sessions of the last two editions of International Workshop on Verification and Evaluation of Computer and Communication Systems (VECoS) held in 2011 in Tunis, and 2012 in Paris.

The aim of the VECoS Workshop is to bring together researchers and practitioners, in the areas of verification, control, performance, quality of service, dependability evaluation and assessment, in order to discuss the state-of-the-art and the challenges in modern computer and communication systems in which functional and non-functional properties are strongly interrelated. Thus, the main motivation for VECoS is to encourage the cross-fertilisation between the various formal verification and evaluation approaches, methods and techniques, and especially those based on the specification formalisms for

concurrent, distributed and software/hardware systems. Beyond its technical and scientific goals, another main purpose of VECoS is to promote collaboration between participants in research and education in the area of computer science and engineering.

The programme committees included researchers from 15 countries and more than 40 laboratories. Each of the 52 submitted papers was evaluated by at least three reviewers. Afterwards, reports were returned to the programme committee for discussion and resolution of conflicts. Based on their recommendations, we selected 23 papers. The proceedings including these accepted papers were published by the eWiC series of the British Computer Society. After VECoS 2012, we invited 16 authors to submit extended versions of their papers. After additional refereeing and further revisions, we were able to accept 13 papers for inclusion in this special issue divided in two parts.

Part 1 comprises the following seven papers:

- A formal framework to specify and verify real-time properties on critical systems
 Nouha Abid, Silvano Dal Zilio and Didier Le Botlan propose a verified approach to the formal verification of timed properties using model-checking techniques. This approach is focused on a set of real-time specification patterns commonly found during the analysis of reactive systems.
- LTL translation improvements in Spot 1.0
 Alexandre Duret-Lutz gives an overview of the various techniques implemented in the Spot library to translate LTL formulae into Büchi automata, favouring either conciseness or determinism.
- On combining the ready sets with the covering steps methods
 Hanifa Boucheneb and Kamel Barkaoui show how the partial-order methods which are covering steps graph and ready sets techniques can be combined and applied for checking LTL-X properties on time Petri nets.
- Verifying while loops with invariant relations
 Asma Louhichi, Wided Ghardallou, Khaled Bsaies, Lamia Labed Jilani, Olfa Mraïhi and Ali Mili show that contrary to invariant assertions which can only be used to prove that a loop is correct, the invariant relations can be used to prove that a loop is correct (if they subsume the specification of the loop) or incorrect (if they are incompatible with the specification of the loop). Also, they present an algorithm that analyses a loop by generating a succession of invariant relations until the specification is either subsumed (i.e., the loop is correct) or found to be incompatible (the loop is incorrect).
- A RT-Maude-based framework for component installation
 Meriem Belguidoum, Faiza Belala and Fateh Latreche present a RT-Maude based framework for safe component installation. This framework is implemented using real-time Maude system enabling both the real-time installation execution and its formal analysis using its LTL model checker.

- **Managing energy in a network of reconfigurable optical add/drop multiplexers**
Jean-Michel Fourneau, Nora Izri and Dominique Verchère present a tool to study the trade-off between energy consumption and performance in an optical network based on reconfigurable add and drop multiplexers and the existence of a hibernate mode for the lasers. The tool computes numerically the steady-state distribution of Markov chains to evaluate the delays and the losses at the interfaces.
- **Strong and weak stochastic bounds for multidimensional Markov chains**
Hind Castel-Taleb and Nihal Pekergin analyse the performance of a general queuing system similar to a Jackson network. They define different queueing systems representing bounding systems in the sense of the strong and the weak stochastic orderings. The accuracy of derived performance measure bounds are compared with respect to the applied stochastic ordering and the input parameters.

Part 2 will appear in another volume with the following six papers:

- 1 End-to-end latency and temporal consistency analysis in networked real-time systems (Michaël Lauer, Frédéric Boniol, Claire Pagetti and Jérôme Ermont)
- 2 Size analysis in multiprocessor real-time scheduling (Annie Choquet-Geniet and Gaëlle Largeteau-Skapin)
- 3 Controllability for discrete event systems modelled in VeriJ (Yan Zhang, Béatrice Bérard, Lom Messan Hillah, Fabrice Kordon and Yann Thierry-Mieg)
- 4 Transactional Petri nets: a semantic framework for UML2 activities (Sabine Boufenara, Kamel Barkaoui, Faiza Belala and Hanifa Boucheneb)
- 5 Compositional reactive semantics of system-level designs written in SystemC and formal verification with predicate abstraction (Nesrine Harrath and Bruno Monsuez)
- 6 Functional safety of adaptive embedded control systems: new solutions (Atef Gharbi and Mohamed Khargui)

We are grateful to all members of the programme and organising committees and to all referees of this special issue for their hard work. The support and encouragement of the steering committee were invaluable assets. Finally, we would like to thank all the authors of the invited and submitted papers and all the participants of the workshop.