Formal Aspects of Computing

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Editorial

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This Special Issue of the Formal Aspects of Computing journal is dedicated to the topic of Integrated Formal Methods. Complexity in contemporary systems can be addressed by combining varied approaches: formal reasoning can take the form of, e.g., property verification, refinement, and model checking, applied both qualitatively and quantitatively; formal modelling can take on, among others, an algebraic view or an automata theory form, and can be applied from distributed to real-time systems and web services.

All these aspects are considered in the current issue, based on papers initially published in the proceedings of iFM 2013: 10th International Conference on integrated Formal Methods, Turku, Finland, June 10–14, 2013. This is one of the major conferences in Formal Methods, organised approximatively every one and a half years. In the last decade, the integration of formal methods has attracted such a significant interest in the research community that many other conferences adopt it. However, it is the focus of the iFM conference to select the most interesting and technically relevant papers on the topic. The 2013 edition collected 25 reviewed papers and 4 invited papers.

The Formal Aspects of Computing journal kindly agreed to host a special issue for the 10th edition of the iFM conference. We are much indebted to the Editor-in-chief Jim Woodcock and to the Associate Editor John Cooke for helping us prepare this special issue.

A total of 8 articles, initially published in the iFM 2013 proceedings, were originally invited to this special issue. In the end, the special issue contains 5 extended and thoroughly revised versions of iFM 2013 papers, out of which 4 were regular papers and one was an invited paper at the conference. The following articles appear in this special issue:

– An Algebraic Theory for Web Service Contracts, by Cosimo Laneve and Luca Padovani: Web Service contracts are studied in this paper at different levels of abstraction and a semantics for them is proposed in bpel to understand the correctness of client-server interactions. Process algebra concepts are integrated with bpel and further extended to also provide for service discovery.

– A Compositional automata-based Semantics and Preserving Transformation Rules for Testing Property Patterns, by Safouan Taha, Jacques Julliard, Frederic Dadeau, Kalou Cabrera Castillos, and Bilal Kanso: In this paper, an earlier language of patterns and scopes specifying dynamic properties is given an automata theory semantics that is compositional and provides extensibility to the original language. The original and the automata based semantics are compared through model checking and the new semantics is used for evaluating test suites.

– Quantified Abstract Configurations of Distributed Systems, by Elvira Albert, Jesus Correas, German Puebla, Guillermo Roman-Diez: Abstraction is employed in this paper to analyse distributed systems from a quantitative point of view, by enriching the abstract view of the system with upper bounds inferred from resource analysis. Performance indicators are then defined to measure the quality of the systems.

– Program Equivalence by Circular Reasoning, by Dorel Lucanu and Vlad Rusu: The equivalence of programs is studied in this paper based on so-called observation relations, which are a form of trace semantics. The equivalence of terminating and non-terminating programs, of concrete and symbolic programs, and of programs written in different programming language paradigms is shown.

– Structural Transformations for Data Enriched Real-Time Systems, by Ernst-Ruediger Olderog and Mani Swaminathan: Real-time systems modelled via extended time automata are studied with respect to several design-level structural transformations. The interplay between these transformations is analysed in order to enable easier property verification of these systems, for instance easier reachability analysis.

We are very happy with the end result of the Integrated Formal Methods special issue and hope that the readers will enjoy the papers.

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