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# Concurrency, Specification, and Programming: Special Issue of Selected Papers of CS&P 2016

## Preface

This special issue of Fundamenta Informaticae is dedicated to papers selected from the 26th International Workshop on CONCURRENCY, SPECIFICATION, AND PROGRAMMING (CS&P 2016), which was held in September 28 – 30, 2016 in Rostock, Germany.

After the event, some authors of the papers presented at the workshop were invited to submit a revised and extended version of their papers, which underwent another reviewing process to guarantee that the revised papers meet the standards of FUNDAMENTA INFORMATICAE. Eventually, nine papers have been selected for publication in this special issue, giving a representative account of current issues and topics related to Concurrency, Specification, and Programming. A complete collection of the contributions to CS&P 2016 has been edited by scientists of Rostock University and published before the workshop as Proceedings.

The article 'Superposition Principle in Composable Hybrid Automata' by Jafar Akhundov, Peter Tröger, and Matthias Werner, discusses problems related to a composition of hybrid automata and presents a new formalism. The approach deals with the superposition principle for flow functions, which makes it specifically useful for practical modelling purposes in the spacecraft and control domain.

In the paper 'Reversing Transitions in Bounded Petri Nets' Kamila Barylska, Evgeny Erofeev, Maciej Koutny, Łukasz Mikulski, and Marcin Piątkowski consider reversibility in the context of Petri nets. They concentrate on nets with finite state spaces and show, in particular, that every transition in such nets can be reversed using a suitable set of new transitions.

In the article 'A Protocol of Mutual Exclusion for DSM Based on Vectors of Global Timestamps' Ludwik Czaja describes a new protocol using vectors of global timestamps for mutual exclusion in systems with Distributed Shared Memory. Some properties of the protocol are also proved.

In the paper 'Rough Sets and Sorites Paradox' by Andrzej Jankowski, Andrzej Skowron, and Piotr Wasilewski, the rough set approach to approximation of vague concepts is discussed. The paper contains a continuation of discussion on the relationships of rough sets with the sorites paradox.

In the article 'Computing Bisimulation-Based Comparisons' by Linh Anh Nguyen, the first algorithm with a polynomial time complexity for computing the largest bisimulation-based auto-comparison of a labeled graph in the setting with counting successors is presented. Moreover, an efficient algorithm

for computing the largest bisimulation-based auto-comparison and the directed similarity relation of a labeled graph in the setting without counting successors is defined.

Artur Niewiadomski, Piotr Świtalski, Marcin Kowalczyk, and Wojciech Penczek present in the article 'TripICS - a Web Service Composition System for Planning Trips and Travels' the web service composition system TripICS, which allows for an easy and user-friendly planning of visits to interesting cities and places around the world in combination with travels, arranged in the way satisfying the user's requirements. The system finds an optimal plan by applying a modification of the most efficient concrete planner of PlanICS based on a combination of an SMT-solver with the algorithm GEO.

In the article 'Full Axiomatisation of Timed Processes of Interval-Timed Petri Nets' Elisabeth Pelz uses partial order semantics to express the truly concurrent behaviour of Interval-Timed Petri nets (ITPNs) with autoconcurrency and zero duration, with its standard maximal step semantics. The author proposes several original 'global' axioms which yield a full axiomatic definition of timed processes for ITPNs.

The article 'Extrapolation of an Optimal Policy using Statistical Probabilistic Model Checking' by Artur Rataj and Bożena Woźna-Szcześniak, presents different ways of an approximate extrapolation of an optimal policy of a small model equivalent to the model, which is too large to find its exact policy directly using probabilistic model checking (PMC). The authors obtain a global optimal resolution of non-determinism in several small Markov Decision Processes (MDP) or its extensions like Stochastic Multi-player Games (SMG) using PMC, and use that resolution to form a hypothesis about an analytic decision boundary representing a respective policy in an equivalent large MDP/SMG.

In the article 'Trying to Understand PEG' Roman R. Redziejowski considers Parsing Expression Grammar (PEG) that encodes a recursive-descent parser with limited backtracking. PEG seems to be almost identical to a grammar in the Extended Backus-Naur Form. However, there is no general algorithm to check if the grammar has efficient backtracking, but this can be often checked by inspection. The paper outlines an interactive tool to facilitate such an inspection.

Once again, we would like to thank Holger Schlingloff and his organizing team for hosting and organizing CS&P 2016. We would like to thank the authors of the papers for their additional effort in extending and revising their conference papers. Moreover, we would like to thank the reviewers and PC members of CS&P 2016 for their comments during the selection process, and the reviewers of this special issue for their careful work and detailed reviews, which resulted in high-quality contributions. Finally, we would like to thank Damian Niwiński for giving us the opportunity to publish this special issue and the publishing team at FUNDAMENTA INFORMATICAE for their practical support.

Ludwik Czaja, lczaja@mimuw.edu.pl
Wojciech Penczek, penczek@ipipan.waw.pl
Holger Schlingloff, hs@informatik.hu-berlin.de
Nguyen Hung Son, son@mimuw.edu.pl
Editors of this special issue

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