

Preface to the Special Issue on Computer Science in Russia 2016

Alexander S. Kulikov¹ · Gerhard J. Woeginger²

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This special issue of *Theory of Computing Systems* is dedicated to the 11th International Computer Science Symposium in Russia (CSR) that has been held during June 9–13, 2016, in St. Petersburg, Russia. The symposium was hosted and organized by the Steklov Mathematical Institute at St. Petersburg of the Russian Academy of Sciences (PDMI), and co-chaired by Alexander S. Kulikov and Gerhard J. Woeginger. CSR represents Theoretical Computer Science in all its aspects, a vibrant field that is turning into an abundant source of ideas and concepts for a variety of other research disciplines and applications.

The authors of the contributions to this special issue of TOCS were asked to submit journal versions of their CSR articles. These submissions were thoroughly reviewed according to the high standards of regular issues of TOCS. We would like to thank all authors for their efforts in preparing the journal versions of their CSR contributions. We also thank the numerous reviewers (who were recruited from the CSR 2016 program committee as well as from external institutions) for their thorough reports.

We present a short description of the contributions in this issue.

The paper *Level two of the quantifier alternation hierarchy over infinite words* by Manfred Kufleitner and Tobias Walter addresses the membership problem for a certain fragment of first-order logic over infinite words. They give an effective characterization of the Boolean closure of the alphabetic topology.

The paper *Tropically convex constraint satisfaction* by Manuel Bodirsky and Marcello Mamino discusses the constraint satisfaction problem for max-closed

✉ Alexander S. Kulikov
alexander.s.kulikov@gmail.com

Gerhard J. Woeginger
woeginger@algo.rwth-aachen.de

¹ Steklov Institute of Mathematics at St. Petersburg, 191023, St. Petersburg, Russia

² Department of Computer Science, RWTH Aachen, 52074 Aachen, Germany

semilinear constraints. Among many other results, they develop a new duality for open tropically convex relations, which puts the CSP for tropically convex semilinear constraints into the intersection of NP and co-NP.

Zeev Nutov in his paper *Improved approximation algorithms for minimum cost node-connectivity augmentation problems* studies polynomial time approximation algorithms for augmenting the connectivity in undirected and directed graphs.

The paper *On approximating (connected) 2-edge dominating set by a tree* by Toshihiro Fujito and Tomoaki Shimoda analyzes a variant of the edge dominating set problem and derives several polynomial time approximation algorithms with small worst case guarantees.

The paper *Comparing representations for function spaces in computable analysis* by Arno Pauly and Florian Steinberg compares various representations of certain function spaces in the context of computable analysis.

Alexander Kozachinskiy in the paper *On Slepian-Wolf theorem with interaction* deals with interactive analogues of the classical Slepian-Wolf theorem. He presents communication protocols with improved bit complexity for several variants.

The paper *Computing and listing st-paths in public transportation networks* by Kateřina Böhmová, Luca Häfliger, Matúš Mihalák, Tobias Pröger, Gustavo Sacomoto and Marie-France Sagot investigates enumeration and listing problems for routes between two given vertices in a graph that satisfy certain constraints on the number of transfers.

The paper *Some complete and intermediate polynomials in algebraic complexity theory* by Meena Mahajan and Nitin Saurabh provides a list of new natural VNP-intermediate polynomial families. They also describe a polynomial whose definition is independent of any computational model, and that can be proved to be VP-complete under polynomial-size projections.

Tim Smith in the paper *Prediction of infinite words with automata* analyzes prediction problems where the predictor is an automaton and where the emitted values are drawn from a finite set. He examines the predictive capabilities of finite automata, pushdown automata, stack automata, and multihead finite automata.

The paper *The word problem for omega-terms over the Trotter-Weil Hierarchy* by Manfred Kufleitner and Jan Philipp Wächter proves that the word problem for ω -terms over each level of the Trotter-Weil Hierarchy is decidable. For every fixed variety in the Trotter-Weil Hierarchy, the resulting algorithm can be implemented in non-deterministic logarithmic space.

René van Bevern, Vincent Froese and Christian Komusiewicz in the paper *Parameterizing edge modification problems above lower bounds* study the parameterized complexity of a certain graph editing problem. They develop a framework of generic data reduction rules to establish fixed-parameter tractability for certain parameters, and they also derive a number of hardness results.

We hope that you enjoy this special issue and that you will take from it some inspirations for your own future research.

St. Petersburg and Aachen, January 2018

Alexander S. Kulikov and Gerhard J. Woeginger