

Preface

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This special issue of Theory of Computing Systems consists of extended journal papers originally presented at the 8th International Computer Science Symposium in Russia (CSR 2013) held on June 25–29, 2013 in Ekaterinburg, Russia. The event was organized by the Ural Federal University and chaired by Arseny Shur. Preliminary versions of papers presented at the conference appear in LNCS 7913. The Program Committee, chaired by Andrei Bulatov, invited several authors to submit extended journal versions of their papers to this special issue. All submissions were reviewed in accordance with customary high standards.

The CSR conference series is devoted to various theoretical questions in Computer Science.

A short description of contributions in this issue is as follows. The paper *Weak Abelian Periodicity of Infinite Words* by Avgustinovich and Puzynina study the properties of infinite words with certain restrictions on the frequencies of letters. In particular, they identify a necessary and sufficient conditions for the weak abelian periodicity of fixed points of uniform binary morphisms.

The paper *Walking on Data Words* by Manuel, Muscholl, and Puppis considers data words, that is, regular words equipped with additional structure. The authors study the class of automata, naturally defined for words of this type, prove that this class is closed under the Boolean operations, study the decidability of some properties of such automata, and compare the expressibility of deterministic and nondeterministic data automata.

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The paper *QuickHeapsort: Modifications and Improved Analysis* by Diekert and Weiß further improve the performance and analysis of the combination of the Quicksort and Heapsort algorithms.

The paper *Multi-weighted Automata and MSO Logic* by Droste and Perevoshchikov studies weighted automata and introduces a logic suitable for describing such automata. The main result of the paper shows that this multi-weighted MSO logic and multi-weighted automata are expressively equivalent both for finite and infinite words.

The paper *An Improved Approximation Scheme for Variable-Sized Bin Packing* by Erich and Kraft presents a new approximation scheme for these generalizations of the classical Bin Packing problem.

The paper *Complexity of Fixed-Size Bit-Vector Logics* by Kovásznaï, Fröhlich, and Biere studies binary encodings of bit-vector logics, and gives an insight into where the additional expressiveness of binary encoding comes from. It also provides new complexity results for certain fragments of different bit-vector logics.

Finally, the paper *Information Lower Bounds via Self-Reducibility* by Braverman, Garg, Pankratov, and Weinstein gives new lower bounds on two well studied functions in communication complexity. For Gap Hamming Distance the paper proves a linear lower bound, while for Inner Product the paper establishes a lower bound that is very close to the trivial upper bound.

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