FOREWORD

Special Issue Dedicated to the 16th International Symposium on Parameterized and Exact Computation

Petr A. Golovach[1] · Meirav Zehavi[2]

Foreword

We are pleased to present this special issue of Algorithmica dedicated to the 16th International Symposium on Parameterized and Exact Computation (IPEC 2021) which took place September 8–10, 2021. Due to the COVID-19 pandemic, IPEC was held online as a part of ALGO 2021. IPEC (formerly IWPEC) is a series of international symposia covering research in all aspects of parameterized and exact algorithms and complexity. Launched in 2004 as a biennial workshop, it became an annual event in 2009 and is now a highly recognized annual meeting. This special issue is a successor of the following special issue volumes of Algorithmica:

- Volumes 64(1)-2012 and 65(4)-2013 dedicated to IPEC 2010, held in Chennai (India);
- Volume 71(3)-2015 dedicated to IPEC 2013, held in Sophia Antipolis (France);
- Volume 75(2)-2016 dedicated to IPEC 2014, held in Wrocław (Poland);
- Volume 79(1)-2017 dedicated to IPEC 2015, held in Patras (Greece);
- Volume 81(2)-2019 dedicated to IPEC 2016, held in Aarhus (Denmark);
- Volume 81(10)-2019 dedicated to IPEC 2017, held in Vienna (Austria);
- Volume 82(8)-2020 dedicated to IPEC 2018, held in Helsinki (Finland);
- Volume 83(8)-2021 dedicated to IPEC 2019, held in Munich (Germany); and
- Volume 84(8)-2022 dedicated to IPEC 2020, held online.

This special issue comprises a selection of twelve extended journal papers that were presented at IPEC 2021. Among the twenty-five papers presented at IPEC, we invited the authors of the papers with the best scores of Program Committee to submit the full

✉ Petr A. Golovach
   Petr.Golovach@uib.no

✉ Meirav Zehavi
   meiravze@bgu.ac.il

[1] University of Bergen, Bergen, Norway

[2] Ben-Gurion University of the Negev, Beer-Sheva, Israel

extended versions to this volume. After a rigorous reviewing phase, according to the high standard of the journal, the following papers were accepted for publication.

In the paper "The fine-grained complexity of multi-dimensional ordering properties" Haozhe An, Mohit Gurumukhani, Russell Impagliazzo, Michael Jaber, Marvin Künnemann, and Maria Paula Parga Nina introduce and investigate a class of problems whose input is an n-sized set of d-dimensional vectors, and where the problem is first-order definable using comparisons between coordinates.

In the paper "Introducing lop-kernels: a framework for kernelization lower bounds" by Júlio Araújo, Marin Bougeret, Victor Campos, and Ignasi Sau, the authors introduce a simple general framework to obtain kernelization lower bounds for a certain type of kernels for optimization problems, which they call lop-kernels.

In the paper "CNF Satisfiability in a Subspace and Related Problems", Vikraman Arvind and Venkatesan Guruswami introduce and investigate the problem of finding a satisfying assignment to a CNF formula that must further belong to a prescribed input subspace.

In the paper "Dynamic Kernels for Hitting Sets and Set Packing" by Max Bannach, Zacharias Heinrich, Rüdiger Reischuk, and Till Tantau, the authors generalize the Hitting Set problem, which is well studied from the kernelization viewpoint, to the dynamic setting.

In the paper "(Sub)linear kernels for edge modification problems towards structured graph classes" by Gabriel Bathie, Nicolas Bousquet and Théo Pierron, the authors explore the question of whether linear kernels are a theoretical limit in edge modification problems.

In the paper "Twin-width and polynomial kernels" by Édouard Bonnet, Eun Jung Kim, Amadeus Reinald, Stéphan Thomassé, and Rémi Watrigant, the authors study the existence of polynomial kernels, for parameterized problems without a polynomial kernel on general graphs, when restricted to graphs of bounded twin-width.

In the paper "A Polynomial Kernel for Bipartite Permutation Vertex Deletion" by Jan Derbisz, Lawqueen Kanesh, Jayakrishnan Madathil, Abhishek Sahu, Saket Saurabh, and Shaily Verma, the authors design a polynomial kernel for the Permutation Vertex Deletion problem, resolving an open problem.

In the paper "Dynamic data structures for timed automata" by Alejandro Grez, Filip Mazowiecki, Michał Pilipczuk, Gabriele Puppis, and Cristian Riveros, the authors study a variant of the classical membership problem in automata theory, which consists of deciding whether a given input word is accepted by a given automaton, through the lens of parameterized dynamic data structures.

In the paper "Maximum Matching in almost linear time on graphs of bounded clique-width", Guillaume Ducoffe gives an almost linear-time algorithm to compute a maximum matching in any bounded clique-width graph with a given corresponding clique-width expression.

In the paper "Optimal centrality computations within bounded clique-width graphs" also by Guillaume Ducoffe, the author presents algorithms for computing some well-known centrality indices (eccentricity and closeness) on graphs of bounded clique-width.

In the paper "Preprocessing for Outerplanar Vertex Deletion: An Elementary Kernel of Quartic Size" by Bart M. P. Jansen, Huib Donkers, and Michał Włodarczyk, the authors demonstrate a polynomial kernel for the Outerplanar Deletion problem.

In the paper "Hardness of Metric Dimension in Graphs of Constant Treewidth", Shaohua Li and Marcin Pilipczuk show that the Metric Dimension problem is para-NP-hard under treewidth parameterization, resolving a long standing open problem.

The editors would like to thank all authors and reviewers for contributing to this special issue. We would also like to express our appreciation to the editorial staff of Algorithmica for their assistance.