Preface

Preface: Algorithmic Graph Theory on the Adriatic Coast

We are pleased to present this special issue of *Discrete Applied Mathematics*, which is devoted to the workshop *Algorithmic Graph Theory on the Adriatic Coast*, held at the University of Primorska, Koper, Slovenia, from 16 to 19 June, 2015. The workshop attracted 100 participants from 21 countries and featured excellent invited talks by Endre Boros (Rutgers University), Vadim V. Lozin (University of Warwick), Sang-il Oum (KAIST), and Dimitrios M. Thilikos (National and Kapodistrian University of Athens and CNRS, LIRMM).

All 21 papers of the special issue have been fully refereed and adhere to the high standards of *Discrete Applied Mathematics*, and we thank all reviewers for their hard work. We thank all authors for their contributions and are pleased that three invited speakers of the workshop contributed to the special issue with an invited perspective on a topic of their expertise. The paper “From matchings to independent sets”, by Vadim Lozin, reviews various techniques on augmenting graphs and graph transformations for obtaining efficient algorithms for the maximum independent set problem restricted to special graph classes. The paper “Recent techniques and results on the Erdős–Pósa property”, by Jean-Florent Raymond and Dimitrios M. Thilikos, studies connections between packing and covering problems on graphs, focusing on the Erdős–Pósa property, which can be used to express min–max relations in graph theory. The paper “Rank-width: Algorithmic and structural results”, by Sang-il Oum, surveys known algorithmic and structural results on rank-width, a width parameter which describes how to decompose a graph into a tree-like structure by 'simple' cuts. The other 18 papers in the special issue report new results on topics in structural, algorithmic, and extremal graph theory, including:

(i) advances on the degree/diameter problem;
(ii) characterizations of graph classes including König–Egerváry graphs, 2-probe block graphs, regular coronoids, neighborhood perfect graphs, and graphs in which the difference between the chromatic number and the maximum degree is bounded for every induced subgraph; and
(iii) classical and parameterized complexity studies, including hardness results, polynomial-time algorithms, and subexponential-time algorithms for several graph problems including shortest path problems (a reconfiguration variant, all-pairs shortest paths, and the newly introduced shortest connection game); vertex and edge coloring problems (classical colorability, connected pseudoachromatic index, and the newly introduced $F$-WORM colorings and colorful edge decompositions); the independent set problem; domination problems ($k$-tuple domination, liar's domination, and the newly introduced strong Roman domination); the vertex planarization problem; and the graph motif problem.

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