

Guest Editorial: Special Issue on Combinatorial Optimization and Applications

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The aim of this special issue is devoted to the theme of combinatorial optimization and its application. It consists of seven papers covering various areas within this theme, such as computational geometry, networking, graph theory, and parameterized complexity. They have undergone rigorous peer-review according to the journal's high standards. There are 21 submissions to this special issue and the accept rate is 33%.

The selected papers are briefly discussed as follows:

The first paper is “Scaffolding problems revisited: Complexity, Approximation and Fixed Parameter Tractable algorithms, and some special cases”, by Annie Chateau et al. This paper is devoted to new results about the scaffolding problem which aims at finding a collection of disjoint cycles and paths covering a particular graph called the scaffold graph.

The second paper is “Discovering small target sets in social networks: A fast and effective algorithm”, by Ugo Vaccaro et al. This paper is devoted to presenting a fast algorithm which improves on the previously known upper bound for finding a small subset of nodes in a network that can influence the whole network.

The third paper is “Optimal approximation algorithms for maximum distance-bounded subgraph problems”, by Yuichi Asahiro et al. This paper is devoted to approximability and inapproximability results for two new distance-based relaxed variants of the maximum clique problem.

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The fourth paper is “Deleting edges to restrict the size of an epidemic: a new application for treewidth”, by Kitty Meeks et al. This paper is devoted to presenting a fixed parameterized algorithm for the problem of deleting at most k edges from a given input graph of small treewidth so that the resulting graph avoids a set of forbidden subgraphs.

The fifth paper is “Structural and algorithmic properties of 2-community structures”, by Janka Chlebikova et al. This paper is devoted to investigating the existence of 2-community structures in some well studied graph classes such as degree bounded graphs and trees.

The sixth paper is “Optimal self-assembly of finite shapes at temperature 1 in 3D”, by Scott Summers et al. This paper is devoted to developing a Turing-universal way of guiding the self-assembly of a scaled-up, just-barely 3D version of an arbitrary input shape at temperature 1 with optimal tile complexity.

The seventh paper is “Trees, Paths, Stars, Caterpillars and Spiders”, by Minghui Jiang et al. This paper is devoted to investigating the problems of finding the least size linear arboricity, star arboricity, caterpillar arboricity, and spider arboricity, respectively, of a bipartite graph and show that they are all NP-complete.

This special issue was preceded by the Ninth Annual International Conference on Combinatorial Optimization and Applications, abbreviated as COCOA'2015, which was held during December 18–20, 2015 in Houston, Texas, USA. Some of the high quality papers for COCOA'2015 were invited to be submitted to this special issue of *Algorithmica*. We thank Texas Southern University for hosting the conference, all the authors for submitting their contributions, the program committee of COCOA'2015 and all the reviewers (who helped select and review the papers).