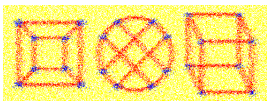
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Special Issue of Selected Papers from the 29th International Symposium on Graph Drawing and Network Visualization (GD 2021) Guest Editors' Foreword

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1 Introduction

This special issue of the Journal of Graph Algorithms and Applications is dedicated to some of the best papers from the 29th International Symposium on Graph Drawing and Network Visualization. Following the online-only GD Symposium in 2020 (hosted by The University of British Columbia, Vancouver), the 2021 event was held in hybrid form and hosted by The University of Tübingen, Germany (September 14-17, 2021), with Michael A. Bekos and Michael Kaufmann as co-chairs of the organizing committee.

The authors of six of the best papers presented at the symposium were invited to submit a revised and extended version of their work to this special issue. The submitted papers went through the standard thorough reviewing process of the journal and five of them were accepted after further revisions. They span a broad range of topics of interest for the Graph Drawing and Network Visualization community, covering both experimental and theoretical aspects of the research field.

The papers appear here in alphabetical order of the last names of the first authors. We briefly introduce all papers.

- Where circles on a plane all intersect at right-angles (an *arrangement of orthogonal circles*), an intersection graph can be obtained by joining each circle centre mid-point with the mid-points of the circles it intersects with. In "Arrangements of orthogonal circles with many intersections", Sarah Carmesin and André Schulz prove that if none of the circles are nested, the intersection graph is planar, and that this is also the case for acute angle intersections. In addition, they determine upper and lower bounds for the number of edges in the intersection graph of an arrangement of orthogonal circles, as well as for the number of triangles.

- Determining the minimum number of edge crossings in a drawing of a graph is NP-complete. Several heuristic methods that have been proposed to address this problem typically entail the re-insertion of edges and/or vertices into a planar representation of the graph. An experimental comparison of several versions of these heuristics (and their combinations) is presented by Markus Chimani, Max Ilsen, and Tilo Wiedera in "Star-Struck by Fixed Embeddings: Modern Crossing Number Heuristics." Their data covers benchmark graph sets, random graphs, hypergraphs as well as theoretically defined graphs. Their evaluation demonstrates the value of a novel heuristic method proposed by the authors.

- Morphing between two isomorphic planar straight-line drawings entails the creation of a series of interim planar straight-line drawings. Such morphing algorithms are typically valued for producing visually appealing transitions and/or for efficiency. Two new morphing algorithms are proposed by Jeff Erickson and Patrick Lin in "Planar and Toroidal Morphs Made Easier", the first for planar straight-line drawings and the second for geodesic drawings on the flat torus. Both algorithms are based on the barycentric interpolation paradigm, and the authors demonstrate that these new algorithms are simpler than existing ones.

- In "Upward planar drawings with three and more slopes", Jonathan Klawitter and Johannes Zink investigate the problem of determining whether a given directed graph admits an upward planar drawing with a specified number k of slopes. Focusing on the special case where $k = 3$, they extend previous results by investigating the complexity of this problem for ordered and unordered directed trees, cactus graphs and outerplanar graphs, with both fixed or variable embeddings. They extend their investigation to $k > 3$ for planar directed graphs.

- Fan-planar graph drawings have the property that all the edges intersecting another edge share the same vertex on the same side of the edge. In a simple drawing no pair of edges may cross more than once. Simple drawings have not hitherto been investigated in the context of fan-planarity. In "Simplifying Non-Simple Fan-Planar Drawings", Boris Klemz, Kristin Knorr, Meghana M. Reddy, and Felix Schröder consider the category of non-simple fan-planar drawings, and demonstrate how to transform them into simple fan-planar drawings. In particular, their result implies a tight upper bound on the number of edges for fan-planar graphs, and that the recognition of such graphs is NP-hard.

We are grateful to the authors for revising and extending their original GD'21 papers and for producing such high-quality contributions, the referees for their valuable and thorough comments, and the staff of the Journal of Graph Algorithms and Applications who made this special issue possible.