

Title: Graph Drawing: Visualization and Geometric Representations of Graphs and Networks

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Abstract: This thesis is devoted to studying of representations of graphs. In Chapters 2–4 we study intersection graphs in the plane. In Chapter 5 we consider problems of modifications of graphs.

Regarding intersection graphs, we prove that all complements of partial 2-trees are intersection graphs of segments. We show complexity of recognition of intersection graphs of path in the grid with bounded number of bends and intersection graphs of connected regions (we call them islands) in the extended grids.

In the part devoted to modification problems we present a fixed-parameter tractable (FPT) algorithm which answers the question whether a given graph can be made planar with at most k contractions and we also provide generalization of this problem.

Keywords: graph theory, graph representations, combinatorics