

Abstract

In this thesis, we study geometric intersection representations of graphs. For a fixed class, the well-known recognition problem asks whether a given graph belongs to this class. We study a generalization of this problem called *partial representation extension*. Its input consists of a graph with a partial representation, so a part of the graph is pre-drawn. The problem asks whether this partial representation can be extended to a representation of the entire graph.

We study this problem for classes of interval graphs, proper interval graphs, unit interval graphs and chordal graphs (in the setting of subtrees-in-tree representations). We give linear-time algorithms for the first two classes and an almost quadratic-time algorithm for unit interval graphs. For chordal graphs, we consider different versions of the problem and show that almost all cases are **NP**-complete.

Even though the classes of proper and unit interval graphs are known to be equal, the partial representation extension problem distinguishes them. For unit interval graphs, it poses additional restrictions concerning precise positions of intervals, and we describe a new structure of unit interval representations to deal with this.