On a graph class generalizing interval and permutation graphs

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Interval graphs and permutation graphs are two important graph classes that have simple geometric intersection models. Interval graphs are the intersection graphs of intervals lying on a horizontal line. Permutation graphs are the intersection graphs of line segments whose endpoints lie on two horizontal lines h_1 and h_2, so that for each segment l, its endpoints l_1 and l_2 lie on h_1 and h_2, respectively. There are a number of well-studied graph classes with geometric intersection models that generalize those of interval and permutation graphs. These include simple-triangle graphs, trapezoid graphs, and t-interval graphs.

We introduce a new class of graphs that arises from a model that naturally generalizes the geometric intersection models of permutation and interval graphs. This geometric model resembles that of permutation graphs in that it consists of two horizontal lines and line segments. However, line segments do not always have to cross from one horizontal line to the other - we also allow for line segments whose endpoints lie on the same horizontal line.

In this talk, we discuss how this class relates to other generalizations of interval and permutation graphs and present polynomial algorithms for the clique and independent set problems on this class when the intersection model is known.

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