

# Partitioning perfect graphs into unions of comparability graphs

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## Abstract

We define and investigate two graph parameters called the *comparability partition number* and *comparability union number*. For a graph  $G$ , we define these numbers as the minimum number of comparability graphs needed to partition or to cover the graph respectively. We find general upper and lower bounds for both, in terms of the chromatic and clique numbers of  $G$ . Then we investigate the case where  $G$  is a perfect graph in detail. For a variety of classes of perfect graphs, we find that at most two comparability graphs are needed. We go on to disprove that this holds for all perfect graphs, but find that *almost all* perfect graphs can be partitioned into two comparability graphs, in the sense that the proportion of perfect graphs that can be partitioned into two comparability graphs tends to one as the number of vertices of  $G$  tends to infinity.