Treelike Comparability Graphs

February 15, 2006

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A comparability graph is a simple graph which admits a transitive orientation on its edges. Each one of such orientations defines a poset on the vertex set, and also it is said that this graph is the comparability graph of the poset. A treelike poset is a poset whose covering graph is a tree. Comparability graphs of arborescence posets are known as trivially perfect graphs. These have been characterized by Wolk and Golumbic.

In this article we study treelike comparability graphs, that is, comparability graphs of treelike posets. We prove necessary and sufficient conditions that a prime comparability graph must verify for being a treelike comparability graph. Based on the modular decomposition we give a characterization of treelike graphs which leads to a decision algorithm.

Keywords: autonomous sets, comparability graphs, prime graphs, treelike graphs.