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Computing a minimum outer-connected dominating set for the class of chordal graphs.
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Summary: For a graph $G = (V, E)$, a dominating set is a set $D \subseteq V$ such that every vertex $v \in V \setminus D$ has a neighbor in $D$. Given a graph $G = (V, E)$ and a positive integer $k$, the minimum outer-connected dominating set problem for $G$ is to decide whether $G$ has a dominating set $D$ of cardinality at most $k$ such that $G[V \setminus D]$, the induced subgraph by $G$ on $V \setminus D$, is connected. In this paper, we consider the complexity of the minimum outer-connected dominating set problem for the class of chordal graphs. In particular, we show that the minimum outer-connected dominating set problem is NP-complete for doubly chordal graphs and undirected path graphs, two well studied subclasses of chordal graphs. We also give a linear time algorithm for computing a minimum outer-connected dominating set in proper interval graphs. Notice that proper interval graphs form a subclass of undirected path graphs as well as doubly chordal graphs.

MSC:
05C85 Graph algorithms (graph-theoretic aspects)
05C69 Vertex subsets with special properties (dominating sets, independent sets, cliques, etc.)
68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)
68R10 Graph theory (including graph drawing) in computer science

Keywords:
graph algorithms; domination; outer-connected domination; proper interval graph; doubly chordal graph; undirected path graph; NP-complete

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References:


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