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1 Introduction

A graph is an ordered pair $G = (V, E)$ consisting of a finite nonempty set V of vertices and a set E of edges, where each edge is an unordered pair of vertices. A dominating set of a graph $G = (V, E)$ is a set $D \subseteq V$ such that each vertex not in D has at least one neighbor in D. A paired-dominating set is a dominating set whose induced subgraph contains at least one perfect matching [2].

Raz and Safra prove that the dominating set problem has no polynomial-time can implement an approximation algorithms better than $C \log |V|$ [3].

Ching-Chi Lin and Hai-Lun Tu designed an $O(m+n)$ time algorithm for interval graphs and an $O(m(m+n))$ time algorithm for circular-arc graphs. They to solve the paired domination problem in interval graphs, They propose an $O(n)$ time algorithm that searches for a minimum paired-dominating set of G incrementally in a greedy manner. Then they extend the results to design an algorithm for circular-arc graphs that also runs in $O(n)$ time[1].

References

[1] H.-L. Tu C.-C. Lin. Linear-time algorithms for the paired-domination problem in interval graphs and circular-arc graphs. 2014.

[2] T. W. Haynes and P. J. Slater. Paired-domination in graphs. *Networks*, 32(3):199–2061, 1998.

[3] R. Raz and S. Safra. A sub-constant error-probability low-degree test, and a sub-constant error-probability PCP characterization of NP. In *Proceedings of the 29th Annual ACM Symposium on Theory of Computing*, pages 475–484, 1998.