THE SLATER AND SUB-\(k\)-DOMINATION NUMBER OF A GRAPH WITH APPLICATIONS TO DOMINATION AND \(k\)-DOMINATION

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Abstract
In this paper we introduce and study a new graph invariant derived from the degree sequence of a graph \(G\), called the sub-\(k\)-domination number and denoted \(\text{sub}_k(G)\). This invariant serves as a generalization of the Slater number; in particular, we show that \(\text{sub}_k(G)\) is a computationally efficient sharp lower bound on the \(k\)-domination number of \(G\), and improves on several known lower bounds. We also characterize the sub-\(k\)-domination numbers of several families of graphs, provide structural results on sub-\(k\)-domination, and explore properties of graphs which are \(\text{sub}_k\)-critical with respect to addition and deletion of vertices and edges.

Keywords: Slater number, domination number, sub-\(k\)-domination number, \(k\)-domination number, degree sequence index strategy.

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References


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