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

DAVID AMOS

Texas A&M University
e-mail: dave.amos@live.com

JOHN ASPLUND

Dalton State College
e-mail: jasplund@daltonstate.edu

BORIS BRIMKOV

Rice University
e-mail: boris.brimkov@rice.edu

AND

RANDY DAVILA

University of Johannesburg
University of Houston-Downtown
e-mail: davilar@uhd.edu

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 $\text{sub}_k(G)$-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.

2010 Mathematics Subject Classification: 05C69.
References


doi:10.1155/S016117129000031X


doi:10.1016/j.dam.2014.05.037


doi:10.1016/j.dam.2015.08.002

doi:10.1002/jgt.3190150107

doi:10.1002/jgt.20279


doi:10.1137/12090054X

doi:10.1016/j.dam.2010.05.021

doi:10.1016/j.dam.2013.02.008


doi:10.1007/978-1-4614-6525-6


doi:10.7151/dmgt.1616

doi:10.7151/dmgt.1222


doi:10.1016/j.aml.2006.03.006


doi:10.1016/j.laa.2007.10.024

Received 15 February 2017
Revised 5 February 2018
Accepted 28 February 2018