INDEPENDENT $(k+1)$-DOMINATING SETS IN k-TREES

Anna Fiedorowicz

University of Zielona Gra, Poland

e-mail: a.fiedorowicz@wmie.uz.zgora.pl

Given a graph G, a set $S \subseteq V(G)$ is called dominating if each vertex of G is either in S or has at least one neighbour in S. In [3, 4], Fink and Jacobson generalised the concept of domination by introducing the k-domination. For an integer $k \geq 1$, a set $S \subseteq V(G)$ is called k-dominating in G if every vertex not in S has at least k neighbours in S.

In this talk we mainly concentrate on the problem of independent k-domination, defined as follows: A subset S of the set of vertices of a graph G is called independent k-dominating if it is both independent and k-dominating in G. Independent k-domination and its generalisations got a lot of attention. In particular, Haynes, Hedetniemi, Henning and Slater studied it for $k = 2$ in the class of trees and characterised all trees having an independent 2-dominating set [5], see also [1]. We consider the problem of constructing an independent $(k+1)$-dominating set in k-degenerate graphs and in k-trees [2]; in particular, we focus on independent 3-domination in 2-trees.

References

[1] M. Blidia, M. Chellali and O. Favaron, Independence and 2-domination in trees, Australas. J. Combin. 33 (2005) 317–327.

[2] M. Borowiecki, A. Fiedorowicz, E. Sidorowicz and Zs. Tuza, Independent $(k+1)$-domination in k-trees, Discrete Appl. Math. 284 (2020) 99–110.

[3] J.F. Fink and M.S. Jacobson, n-domination in graphs, in: Graph Theory with Applications to Algorithms and Computer Science, John Wiley and Sons, New York, 1985, 282–300.

[4] J.F. Fink and M.S. Jacobson, On n-domination, n-dependence and forbidden subgraphs, in: Graph Theory with Applications to Algorithms and Computer Science, John Wiley and Sons, New York, 1985, 301–311.

[5] T.W. Haynes, S.T. Hedetniemi, M.A. Henning and P.J. Slater, H-forming sets in graphs, Discrete Math. 262 (2003) 159–169.