FAIR TOTAL DOMINATION NUMBER IN CACTUS GRAPHS

MAJID HAJIAN

Department of Mathematics
Shahrood University of Technology
Shahrood, Iran

e-mail: majid_hajian2000@yahoo.com

AND

NADER JAFARI RAD

Department of Mathematics
Shahed University
Tehran, Iran

e-mail: n.jafarirad@gmail.com

Abstract

For $k \geq 1$, a k -fair total dominating set (or just kFTD-set) in a graph G is a total dominating set S such that $|N(v) \cap S| = k$ for every vertex $v \in V \setminus S$. The k -fair total domination number of G , denoted by $ftd_k(G)$, is the minimum cardinality of a kFTD-set. A fair total dominating set, abbreviated FTD-set, is a kFTD-set for some integer $k \geq 1$. The fair total domination number of a nonempty graph G , denoted by $ftd(G)$, of G is the minimum cardinality of an FTD-set in G . In this paper, we present upper bounds for the 1-fair total domination number of cactus graphs, and characterize cactus graphs achieving equality for the upper bounds.

Keywords: fair total domination, cactus graph.

2010 Mathematics Subject Classification: 05C69.

REFERENCES

- [1] Y. Caro, A. Hansberg and M.A. Henning, *Fair domination in graphs*, Discrete Math. **312** (2012) 2905–2914.
doi:10.1016/j.disc.2012.05.006

- [2] B. Chaluvvaraju, M. Chellali and K.A. Vidya, *Perfect k -domination in graphs*, Australas. J. Combin. **48** (2010) 175–184.
- [3] B. Chaluvvaraju and K. Vidya, *Perfect dominating set graph of a graph*, Adv. Appl. Discrete Math. **2** (2008) 49–57.
- [4] E.J. Cockayne, B.L. Hartnell, S.T. Hedetniemi and R. Laskar, *Perfect domination in graphs*, J. Combin. Inform. System Sci. **18** (1993) 136–148.
- [5] I.J. Dejter, *Perfect domination in regular grid graphs*, Australas. J. Combin. **42** (2008) 99–114.
- [6] I.J. Dejter and A.A. Delgado, *Perfect domination in rectangular grid graphs*, J. Combin. Math. Combin. Comput. **70** (2009) 177–196.
- [7] M.R. Fellows and M.N. Hoover, *Perfect domination*, Australas. J. Combin. **3** (1991) 141–150.
- [8] M. Hajian and N. Jafari Rad, *Trees and unicyclic graph with large fair domination number*, Util. Math., to appear.
- [9] M. Hajian and N. Jafari Rad, *Fair domination number in cactus graphs*, Discuss. Math. Graph Theory **39** (2019) 489–503.
doi:10.7151/dmgt.2088
- [10] M. Hajian, N. Jafari Rad and L. Volkmann, *Bounds on the fair total domination number in trees and unicyclic graphs*, Australas. J. Combin. **74** (2019) 460–475.
- [11] H. Hatami and P. Hatami, *Perfect dominating sets in the Cartesian products of prime cycles*, Electron. J. Combin. **14** (2007) #N8.
doi:10.37236/1009
- [12] T.W. Haynes, S.T. Hedetniemi and P.J. Slater, *Fundamentals of Domination in Graphs* (Marcel Dekker, New York, 1998).
- [13] E.C. Maravilla, R.T. Isla and S.R. Canoy Jr., *Fair total domination in the join, corona, and composition of graphs*, Int. J. Math. Anal. **8** (2014) 2677–2685.
doi:10.12988/ijma.2014.49296

Received 29 August 2018

Revised 3 April 2019

Accepted 3 April 2019