ON UNIQUE MINIMUM DOMINATING SETS IN SOME CARTESIAN PRODUCT GRAPHS

JASON T. HEDETNIEMI

Department of Mathematical Sciences
Clemson University
Clemson, South Carolina 29634, USA
e-mail: jhedetn@clemson.edu

Abstract

Unique minimum vertex dominating sets in the Cartesian product of a graph with a complete graph are considered. We first give properties of such sets when they exist. We then show that when the first factor of the product is a tree, consideration of the tree alone is sufficient to determine if the product has a unique minimum dominating set.

Keywords: vertex domination, graph products, trees.

2010 Mathematics Subject Classification: 05C69, 05C76, 05C05.

REFERENCES

- [1] M. Chellali and T. Haynes, *Trees with unique minimum paired-dominating sets*, Ars Combin. **73** (2004) 3–12.
- [2] E. Cockayne, S. Goodman and S. Hedetniemi, *A linear algorithm for the domination number of a tree*, Inform. Process. Lett. **4** (1975) 41–44.
doi:10.1016/0020-0190(75)90011-3
- [3] M. Fischermann, *Block graphs with unique minimum dominating sets*, Discrete Math. **240** (2001) 247–251.
doi:10.1016/S0012-365X(01)00196-0
- [4] M. Fischermann, *Unique total domination graphs*, Ars Combin. **73** (2004) 289–297.
- [5] M. Fischermann, D. Rautenbach and L. Volkmann, *Maximum graphs with a unique minimum dominating set*, Discrete Math. **260** (2003) 197–203.
doi:10.1016/S0012-365X(02)00670-2
- [6] M. Fischermann, D. Rautenbach and L. Volkmann, *A note on the complexity of graph parameters and the uniqueness of their realizations*, J. Combin. Math. Combin. Comput. **47** (2003) 183–188.
- [7] M. Fischermann and L. Volkmann, *Unique minimum domination in trees*, Australas. J. Combin. **25** (2002) 117–124.
- [8] M. Fischermann and L. Volkmann, *Cactus graphs with unique minimum dominating sets*, Util. Math. **63** (2003) 229–238.
- [9] M. Fischermann and L. Volkmann, *Unique independence, upper domination and upper irredundance in graphs*, J. Combin. Math. Combin. Comput. **47** (2003) 237–249.
- [10] M. Fischermann, L. Volkmann and I. Zverovich, *Unique irredundance, domination, and independent domination in graphs*, Discrete Math. **305** (2005) 190–200.
doi:10.1016/j.disc.2005.08.005
- [11] M. Fraboni and N. Shank, *Maximum graphs with unique minimum dominating set of size two*, Australas. J. Combin. **46** (2010) 91–99.
- [12] G. Gunther, B. Hartnell, L. Markus and D. Rall, *Graphs with unique minimum dominating sets*, in: Proc. 25th S.E. Int. Conf. Combin., Graph Theory, and Computing, Congr. Numer. **101** (1994) 55–63.
- [13] R. Hammack, W. Imrich and S. Klavžar, *Handbook of Product Graphs* (CRC Press, 2011).
- [14] T. Haynes and M. Henning, *Trees with unique minimum total dominating sets*, Discuss. Math. Graph Theory **22** (2002) 233–246.
doi:10.7151/dmgt.1172
- [15] M. Henning, *Defending the Roman Empire from multiple attacks*, Discrete Math. **271** (2003) 101–115.
doi:10.1016/S0012-365X(03)00040-2

- [16] M. Henning and S. Hedetniemi, *Defending the Roman Empire—a new strategy*, Discrete Math. **266** (2003) 239–251.
doi:10.1016/S0012-365X(02)00811-7
- [17] J. Topp, *Graphs with unique minimum edge dominating sets and graphs with unique maximum independent sets of vertices*, Discrete Math. **121** (1993) 199–210.
doi:10.1016/0012-365X(93)90553-6

Received 15 May 2014
Revised 23 December 2014
Accepted 23 December 2014