INDEPENDENT TRANSVERSAL TOTAL DOMINATION VERSUS TOTAL DOMINATION IN TREES

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Abstract

A subset of vertices in a graph G is a total dominating set if every vertex in G is adjacent to at least one vertex in this subset. The total domination number of G is the minimum cardinality of any total dominating set in G and is denoted by $\gamma_t(G)$. A total dominating set of G having nonempty intersection with all the independent sets of maximum cardinality in G is an independent transversal total dominating set. The minimum cardinality of any independent transversal total dominating set is denoted by $\gamma_{tt}(G)$. Based on the fact that for any tree T , $\gamma_t(T) \leq \gamma_{tt}(T) \leq \gamma_t(T) + 1$, in this work we give several relationships between $\gamma_{tt}(T)$ and $\gamma_t(T)$ for trees T which are leading to classify the trees which are satisfying the equality in these bounds.

Keywords: independent transversal total domination number, total domination number, independence number, trees.

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REFERENCES

- [1] C. Brause, M.A. Henning and M. Krzywkowski, *A characterization of trees with equal 2-domination and 2-independence numbers*, Discrete Math. Theor. Comput. Sci. **19** (2017) #1.
doi:10.23638/DMTCS-19-1-1
- [2] A. Cabrera Martínez, J.M. Sigarreta Almira and I.G. Yero, *On the independence transversal total domination number of graphs*, Discrete Appl. Math. **219** (2017) 65–73.
doi:10.1016/j.dam.2016.10.033
- [3] M. Chellali and T.W. Haynes, *A note on the total domination of a tree*, J. Combin. Math. Combin. Comput. **58** (2006) 189–193.
- [4] M.A. Henning, *A survey of selected recent results on total domination in graphs*, Discrete Math. **309** (2009) 32–63.
doi:10.1016/j.disc.2007.12.044
- [5] M.A. Henning and S.A. Marcon, *A constructive characterization of trees with equal total domination and disjunctive domination numbers*, Quaest. Math. **39** (2016) 531–543.
doi:10.2989/16073606.2015.1096860
- [6] M.A. Henning and A. Yeo, *Total Domination in Graphs* (Springer, New York, 2013).
doi:10.1007/978-1-4614-6525-6
- [7] Z. Li and J. Xu, *A characterization of trees with equal independent domination and secure domination numbers*, Inform. Process. Lett. **119** (2017) 14–18.
doi:10.1016/j.ipl.2016.11.004

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