

# WHEN THE CONNECTED DOMINATION NUMBER IS AT MOST THE TOTAL DOMINATION NUMBER

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The perfection of graph invariants has attracted much attention in graph theory. Finding the forbidden subgraphs for a certain type of perfection seems to be accepted as a step in the understanding of the relation of the invariants involved. In particular, this holds for invariants from domination theory [1, 2]. Motivated by the fact that any connected dominating set of size at least 2 is in particular a total dominating set, we give a finite forbidden subgraph characterization of the connected graphs for which any non-trivial connected induced subgraph has the property that the connected domination number is at most the total domination number. Roughly speaking, we characterize the perfection of the connected domination number and the total domination number. It turns out that in this characterization, the total domination number can equivalently be substituted by the upper total domination number, the paired-domination number and the upper paired-domination number respectively. Another equivalent condition is given in terms of structural domination [3, 4].

**Keywords:** connected domination, total domination, paired-domination.

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## References

- [1] I.E. Zverovich, V.E. Zverovich, An induced subgraph characterization of domination perfect graphs, *J. Graph Theory* 31 (1999), pp. 29–49.
- [2] W. Goddard, M.A. Henning, Clique/connected/total domination perfect graphs, *Bull. Inst. Combin. Appl.* 41 (2004), pp. 20–21.
- [3] G. Bacsó, Complete description of forbidden subgraphs in the structural domination problem, *Discrete Math.* 309 (2009), pp. 2466–2472.
- [4] Z. Tuza, Hereditary domination in graphs: Characterization with forbidden induced subgraphs, *SIAM J. Discrete Math.* 22 (3) (2008), pp. 849–853.