

ON THE b -DOMATIC NUMBER OF GRAPHS

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Abstract

A set of vertices S in a graph $G = (V, E)$ is a *dominating set* if every vertex not in S is adjacent to at least one vertex in S . A *domatic partition* of graph G is a partition of its vertex-set V into dominating sets. A domatic partition \mathcal{P} of G is called *b-domatic* if no larger domatic partition of G can be obtained from \mathcal{P} by transferring some vertices of some classes of \mathcal{P} to form a new class. The minimum cardinality of a b -domatic partition of G is called the *b-domatic number* and is denoted by $bd(G)$. In this paper, we explain some properties of b -domatic partitions, and we determine the b -domatic number of some families of graphs.

Keywords: domatic partition, domatic number, b -domatic partition, b -domatic number.

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REFERENCES

- [1] S. Arumugam and K. Raja Chandrasekar, *Minimal dominating sets in maximum domatic partitions*, Australas. J. Combin. **52** (2012) 281–292.
- [2] C. Berge, *Graphs* (North Holland, 1985).
- [3] E.J. Cockayne and S.T. Hedetniemi, *Towards a theory of domination in graphs*, Networks **7** (1977) 247–261.
doi:10.1002/net.3230070305
- [4] G.J. Chang, *The domatic number problem*, Discrete Math. **125** (1994) 115–122.
doi:10.1016/0012-365X(94)90151-1
- [5] O. Favaron, *The b-domatic number of a graph*, Discuss. Math. Graph Theory **33** (2013) 747–757.
doi:10.7151/dmgt.1709
- [6] F. Harary and S. Hedetniemi, *The achromatic number of a graph*, J. Combin. Theory **8** (1970) 154–161.
doi:10.1016/S0021-9800(70)80072-2
- [7] R.W. Irving and D.F. Manlove, *The b-chromatic number of graphs*, Discrete Appl. Math. **91** (1999) 127–141.
doi:10.1016/S0166-218X(98)00146-2
- [8] D.F. Manlove, *Minimaximal and Maximinimal Optimization Problems: A Partial Order-Based Approach* (Ph.D. Thesis, Tech. Rep. 27, Comp. Sci. Dept. Univ. Glasgow, Scotland, 1998).
- [9] O. Ore, *Theory of Graphs* (Amer. Math. Soc, Providence, RI, 1962).
- [10] S.H. Poon, W.C.K. Yen and C.T. Ung, *Domatic partition on several classes of graphs*, Combin. Optim Appl., Lecture Notes in Comput. Sci. **7402** (2012) 245–256.
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