

NEIGHBOURHOOD BALANCED DOMINATION IN SIGNED GRAPHS

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Abstract

A graph when its edges are labeled either as positive or negative becomes a signed graph. Given a signed graph $\Sigma = (V, E, \sigma)$, a subset D of V is said to be a *dominating set* for Σ , if there exists a *marking* $\mu : V \rightarrow \{+1, -1\}$ of Σ such that every vertex u of Σ is either in D or whenever $u \in V \setminus D$, $N(u) \cap D \neq \emptyset$ and $\sigma(uv) = \mu(u)\mu(v)$ for every $v \in N(u) \cap D$ where $N(u)$ denotes the open neighbourhood of a vertex u . Denoting $\Sigma[V \setminus D]$ to be the subgraph of the signed graph Σ induced by the edges in $V \setminus D$, we define D to a *neighbourhood balanced dominating set* if D is a dominating set such that $\Sigma[V \setminus D]$ is balanced. Also we introduce *dom-balanced* signed graphs which are those signed graphs having all the dominating sets as neighbourhood balanced dominating sets. Some bounds on neighbourhood balanced domination number are also discussed.

Key Words : *Signed graph, Domination, Neighbourhood balanced domination, Dombalanced signed graphs.*

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