

SIGNED TOTAL ROMAN DOMINATION IN DIGRAPHS

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Abstract

Let D be a finite and simple digraph with vertex set $V(D)$. A signed total Roman dominating function (STRDF) on a digraph D is a function $f : V(D) \rightarrow \{-1, 1, 2\}$ satisfying the conditions that (i) $\sum_{x \in N^-(v)} f(x) \geq 1$ for each $v \in V(D)$, where $N^-(v)$ consists of all vertices of D from which arcs go into v , and (ii) every vertex u for which $f(u) = -1$ has an inner neighbor v for which $f(v) = 2$. The weight of an STRDF f is $w(f) = \sum_{v \in V(D)} f(v)$. The signed total Roman domination number $\gamma_{stR}(D)$ of D is the minimum weight of an STRDF on D . In this paper we initiate the study of the signed total Roman domination number of digraphs, and we present different bounds on $\gamma_{stR}(D)$. In addition, we determine the signed total Roman domination number of some classes of digraphs. Some of our results are extensions of known properties of the signed total Roman domination number $\gamma_{stR}(G)$ of graphs G .

Keywords: digraph, signed total Roman dominating function, signed total Roman domination number.

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