SIGNED ROMAN EDGE \( k \)-DOMINATION IN GRAPHS

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Abstract

Let \( k \geq 1 \) be an integer, and \( G = (V, E) \) be a finite and simple graph. The closed neighborhood \( N_G[e] \) of an edge \( e \) in a graph \( G \) is the set consisting of \( e \) and all edges having a common end-vertex with \( e \). A signed Roman edge \( k \)-dominating function (SRE\( k \)DF) on a graph \( G \) is a function \( f : E \rightarrow \{-1, 1, 2\} \) satisfying the conditions that (i) for every edge \( e \) of \( G \), \( \sum_{x \in N_G[e]} f(x) \geq k \) and (ii) every edge \( e \) for which \( f(e) = -1 \) is adjacent to at least one edge \( e' \) for which \( f(e') = 2 \). The minimum of the values \( \sum_{e \in E} f(e) \), taken over all signed Roman edge \( k \)-dominating functions \( f \) of \( G \), is called the signed Roman edge \( k \)-domination number of \( G \), and is denoted by \( \gamma'_{sRk}(G) \). In this paper we initiate the study of the signed Roman edge \( k \)-domination in graphs and present some (sharp) bounds for this parameter.

Keywords: signed Roman edge \( k \)-dominating function, signed Roman edge \( k \)-domination number.

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References

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