Roman domination in unicyclic graphs

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Abstract

A *Roman dominating function* on a graph $G = (V,E)$ is a function $f : V \to \{0,1,2\}$ satisfying the condition that every vertex u for which $f(u) = 0$ is adjacent to at least one vertex v for which $f(v) = 2$. The *weight* of a *Roman dominating function* is the value $w(f) = \sum_{u \in V} f(u)$. The minimum weight of a *Roman dominating function* on a graph G is called the *Roman domination number* of G denoted by $\gamma_R(G)$. It has been observed that $\gamma(G) \leq \gamma_R(G) \leq 2\gamma(G)$, where $\gamma(G)$ is the domination number of G. In this paper, we characterize all connected unicyclic graphs for which $\gamma_R(G) \leq \gamma(G) + 2$.

Keywords: *Roman dominating function, Roman domination number, unicyclic graphs.*

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