DOUBLE ROMAN DOMINATION NUMBER OF MIDDLE GRAPH

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Abstract: For any graph $G(V, E)$, a function $f : V(G) \to \{0, 1, 2, 3\}$ is called Double Roman dominating function (DRDF) if the following properties holds,

1. If $f(v) = 0$, then there exist two vertices $v_1, v_2 \in N(v)$ for which $f(v_1) = f(v_2) = 2$ or there exist one vertex $u \in N(v)$ for which $f(u) = 3$.

2. If $f(v) = 1$, then there exist one vertex $u \in N(v)$ for which $f(u) = 2$ or $f(u) = 3$.

The weight of DRDF is the value $w(f) = \sum_{v \in V(G)} f(v)$. The minimum weight among all double Roman dominating function is called double Roman domination