

Extremal Problems Related to the Cardinality Redundance of Graphs

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A dominating set of a graph G is a set of vertices D such that for all $v \in V(G)$, either $v \in D$ or $[v, d] \in E(G)$ for some $d \in D$. The cardinality-redundance of a vertex set S , $CR(S)$, is the number of vertices $x \in V(G)$ such that $|N[x] \cap S| \geq 2$. The cardinality-redundance of G is the minimum of $CR(S)$ taken over all dominating sets S . A set of vertices S such that $CR(S) = CR(G)$ is a γ_{CR} -set, and the size of a minimum γ_{CR} -set is denoted $\gamma_{CR}(G)$. Here, we are concerned with extremal problems concerning cardinality-redundance. We give the maximum number of edges in a graph with a given number of vertices and given cardinality-redundance. In the cases that $CR(G) = 0$ or 1 we give the minimum and maximum number of edges of graphs when $\gamma_{CR}(G)$ is fixed, and when $CR(G) = 2$ we give the maximum number edges of graphs where $\gamma_{CR}(G)$ is fixed. We give the minimum and maximum values of $\gamma_{CR}(G)$ when the number of edges are fixed and $CR(G) = 0, 1$, and we give the maximum values of $\gamma_{CR}(G)$ when the number of edges are fixed and $CR(G) = 2$.

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