Graphs with Power Domination at most 2

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Let G be a connected graph and S a subset of its vertices. Let $C[S]$ be the set obtained from S as follows. First, put into $C[S]$ the vertices from the closed neighborhood of S. Then, repeatedly add to $C[S]$ vertices $w \in V(G) \setminus C[S]$ that have a *private* neighbor v in $C[S]$, i.e., vertices such that all the other neighbors of v are already in $C[S]$. After no such vertex w exists, the set $C[S]$ monitored by S has been constructed. The set S is called a *power dominating set* of G if $C[S] = V(G)$ and the *power domination number* $\gamma_P(G)$ is the minimum cardinality of a power dominating set [1,2].

Notice that $1 \leq \gamma_P(G) \leq \gamma(G)$, since every dominating set is power dominating. Observe also that if either $|V(G)| \leq 5$ or $\gamma(G) = 1$ or $G \in \{P_n, C_n\}$, then $\gamma_P(G) = 1$. In [2], it was shown that if T is a tree, then $\gamma_P(T) = 1$ if and only if T is a spider. In [5], it was proven that if G is a planar graph of diameter 2, then $\gamma_P(G) \leq 2$. Given any two graphs G and H, in [3,4] were displayed a set of necessary and sufficient conditions to guarantee that $\gamma_P(G \Box H) = 1$.

In this talk, we present a number a new results similar and/or related to the previous ones, involving other graph families and graph operations.

References.

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