The relationship between $k$-forcing and $k$-power domination.

Let $G = (V, E)$ be a graph and $k$ a positive integer. For a set $S \subseteq V$, recursively define a family of sets, $S^{(i,k)}$, $i \geq 0$ by $S^{(0,k)} = S$, $S^{(1,k)} = N[S]$, and for each $i \geq 1$, $S^{(i+1,k)} = S^{(i,k)} \cup \{w : \exists v \in S^{i,k} \text{ such that } |N(v) \setminus S^{i,k}| \leq k \text{ and } w \in N(v) \setminus S^{i,k}\}$. The set $S$ is a $k$-power dominating set of a graph $G$ if there is an integer $\ell$ such that $S^{(\ell,k)} = V$ and the minimum integer $\ell$ such that $S^{(\ell,k)} = V$ is the $k$-power propagation time for $S$ in $G$.

Analogously, associate with $S$ another family of sets, $B^{(i,k)}$, $i \geq 0$ defined by $B = B^{(0,k)}$ and for each $i \geq 0$: $B^{(i+1,k)} = \{w : \exists v \in B^{(i,k)} \text{ such that } |N(v) \setminus B^{(i,k)}| \leq k \text{ and } w \in N(v) \setminus B^{(i,k)}\}$. The set $S$ is a $k$-forcing set of $G$ if there is an integer $\ell$ such that $S^{(\ell,k)} = V$ and the minimum integer $\ell$ such that $S^{(\ell,k)} = V$ is the $k$-propagation time for $S$ in $G$.

We show how methods and techniques used to study $k$-power domination transfer to the study of $k$-forcing and vice versa. (Received September 20, 2016)