Mutual transferability for mixed-domination on strongly chordal graphs and cactus graphs

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This talk introduces a variation of domination in graphs called (F, B, R)-domination. Let $G = (V, E)$ be a graph and V be the disjoint union of F, B, and R, where F consists of free vertices, B consists of bound vertices, and R consists of required vertices. An (F, B, R)-dominating set of G is a subset $D \subseteq V$ such that $R \subseteq D$ and each vertex in $B - D$ is adjacent to some vertex in D. An (F, B, R)-2-stable set of G is a subset $S \subseteq B$ such that $S \cap N(R) = \emptyset$ and every two distinct vertices x and y in S have distance $d(x, y) > 2$. We prove that if G is strongly chordal, then $\alpha_{F,B,R,2}(G) = \gamma_{F,B,R}(G) - |R|$, where $\gamma_{F,B,R}(G)$ is the minimum cardinality of an (F, B, R)-dominating set of G and $\alpha_{F,B,R,2}(G)$ is the maximum cardinality of an (F, B, R)-2-stable set of G. Let $D_1 \overset{*}{\to} D_2$ denote D_1 being transferable to D_2. We prove that if G is a connected strongly chordal graph in which D_1 and D_2 are two (F, B, R)-dominating sets with $|D_1| = |D_2|$, then $D_1 \overset{*}{\to} D_2$. We also prove that if G is a cactus graph in which D_1 and D_2 are two (F, B, R)-dominating sets with $|D_1| = |D_2|$, then $D_1 \cup \{1 \cdot \text{extra}\} \overset{*}{\to} D_2 \cup \{1 \cdot \text{extra}\}$, where $\cup\{1 \cdot \text{extra}\}$ means adding one extra element.

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This talk is about a variation of domination in graphs called (F, B, R)-domination.