GLOBAL COMPLETE ALLIANCES IN GRAPHS

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Let $S \subset V(G)$ be a subset of vertices of a given simple nonempty graph $G$. We define for any non-empty subset $X$ of $S$ the predicate $SEC_{G,S}(X) = \text{true}$ iff $|N_G[X] \cap S| \geq |N_G[X] \setminus S|$, where $N_G[X]$ is a closed neighborhood of $X$ in graph $G$. Set $S$ is a complete alliance in $G$ iff for each clique $K$ in $G[S]$ we have $SEC_{G,S}(V(K)) = \text{true}$. Note that $1 \leq |V(K)| \leq \omega(G[S]) \leq \omega(G)$, where $\omega(G)$ is the clique number of a graph $G$. A complete alliance $S$ is a global complete alliance in $G$ if it also dominates $G$. By $\gamma_c(G)$ we denote the size of the minimum global complete alliance in graph $G$.

Authors present their results on problem of finding a minimum global complete alliance in a graph. Authors analyze computational complexity of the problem, showing its $NP$-completeness and presenting some polynomial time algorithms for complete $k$-ary trees, complete $k$-partite graphs, as well as for elementary classes of graphs (paths, cycles, etc.). Moreover, bounds on $\gamma_c$ for some family of graphs are presented.

The presented problem is related to the global defensive alliance [1], global defensive set [2], and global edge alliance [3] problems.

**Keyswors:** Global complete alliance, global alliance, global defensive set, global edge alliance.

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References

