Global Defensive Alliances in the Join, Corona and Composition of Graphs

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Abstract
By a defensive alliance in a graph G we mean any set S of vertices in G such that each vertex in S is adjacent to at least as many vertices inside S, including the vertex itself, as outside S. If, in addition, we require that every vertex outside a defensive alliance S is adjacent to at least one vertex in S, then S becomes a global defensive alliance. The minimum cardinality of a global defensive alliance is the global defensive alliance number of G. In this paper, we determine bounds for the global defensive alliance numbers in the join, corona and composition of graphs.