

Group distance magic graphs

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Given a graph G with n vertices and an Abelian group A of order n , an A -distance magic labeling of G is a bijection from $V(G)$ to A such that all vertices of G have equal weight, where the weight of a vertex is the sum (under the operation of A) of the labels assigned to its neighbors. An A -distance antimagic labeling of G is a bijection from $V(G)$ to A such that the weights of the vertices of G are pairwise distinct. A graph admitting such a labeling is called A -distance magic or A -distance antimagic graph, respectively. These notions are generalizations of distance magic and distance antimagic labelings, where the vertex labels are positive integers from 1 to n and the addition is performed in integers.

We present classes of A -distance magic and antimagic graphs with a focus on product graphs. We prove among other things several general results on group magic or antimagic labelings for Cartesian, direct and strong products of graphs. As applications we obtain several families of graphs admitting group distance antimagic or magic labelings with respect to elementary Abelian groups, cyclic groups or direct products of such groups.