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GENERALIZED SUM LIST COLORINGS OF GRAPHS

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Abstract

A (graph) property $\mathcal{P}$ is a class of simple finite graphs closed under isomorphisms. In this paper we consider generalizations of sum list colorings of graphs with respect to properties $\mathcal{P}$.

If to each vertex v of a graph G a list $L(v)$ of colors is assigned, then in an $(L, \mathcal{P})$-coloring of G every vertex obtains a color from its list and the subgraphs of G induced by vertices of the same color are always in $\mathcal{P}$. The $\mathcal{P}$-sum choice number $\chi_{sc}^{\mathcal{P}}(G)$ of G is the minimum of the sum of all list sizes such that, for any assignment L of lists of colors with the given sizes, there is always an $(L, \mathcal{P})$-coloring of G.

We state some basic results on monotonicity, give upper bounds on the $\mathcal{P}$-sum choice number of arbitrary graphs for several properties, and determine the $\mathcal{P}$-sum choice number of specific classes of graphs, namely, of all complete graphs, stars, paths, cycles, and all graphs of order at most 4.

Keywords: sum list coloring, sum choice number, generalized sum list coloring, additive hereditary graph property.

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