

Coloring Mixed Hypergraphs: survey of last results

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Abstract

Mixed hypergraph is a triple $H=(X,C,D)$ with vertex set X and two families of subsets, C and D , called C -edges and D -edges respectively. Proper coloring of H is an injective mapping from X into a set of k colors $1,2,\dots,k$ in such a way that every C -edge has two vertices of the same color and every D -edge has two vertices of different colors. Mixed hypergraph is called colorable if it admits at least one proper coloring, uncolorable otherwise, and uniquely colorable if it admits precisely one proper coloring apart from permutation of the colors. Maximum and minimum number of colors over all proper colorings which use all the colors are called the upper and lower chromatic numbers respectively. Mixed hypergraph is called planar if it can be embedded in the plane in such a way that edges intersect only at the respective neighborhoods of common vertices. Mixed hypergraph is called C -perfect if the upper chromatic number coincides with the maximum number of vertices which contain no C -edges for each induced subhypergraph. For further information about the topic see the Mixed Hypergraph Coloring Website at <http://math.net.md/voloshin/mh.html>.

We survey last results and open problems on colorable, uncolorable, uniquely colorable, planar and C -perfect mixed hypergraphs.”