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From NMNR-coloring of hypergraphs to homogenous coloring of graphs

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Abstract: An NMNR-coloring of a hypergraph is a coloring of vertices such that in every hyperedge at least two vertices are colored with distinct colors, and at least two vertices are colored with the same color. We prove that every 3-uniform 3-regular hypergraph admits an NMNR-coloring with at most 3 colors. As a corollary, we confirm the conjecture that every bipartite cubic graph admits a 2-homogenous coloring, where a k -homogenous coloring of a graph G is a proper coloring of vertices such that the number of colors in the neighborhood of any vertex equals k . We also introduce several other results and propose some additional problems.

Keywords: Homogenous coloring, mixed hypergraph, bi-hypergraph, NMNR-coloring.

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Od NMNR-barvanja hipergrafov do homogenega barvanja grafov

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Povzetek: NMNR-barvanje hipergrafa je takšno barvanje vozlišč, pri katerem sta v vsaki hiperpovezavi najmanj dve vozlišči različnih barv, najmanj dve vozlišči pa iste barve. Dokažemo, da vsak 3-uniformen 3-regularen hipergraph dopušča NMNR-barvanje z največ tremi barvami. Kot korolar potrdimo domnevo, da ima vsak dvodelen kubičen graf 2-homogeno barvanje, kjer je k -homogeno barvanje grafa G pravo barvanje vozlišč, v katerem je število barv v soseščini kateregakoli vozlišča enako k . Predstavimo še nekaj drugih rezultatov in predlagamo nekaj dodatnih problemov.

Ključne besede: Homogeno barvanje, mešan hipergraf, bi-hypergraph, NMNR-barvanje.

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