

A Mixed Hypergraph Coloring Problem

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A PRCF coloring of a simple graph G is a proper edge coloring of G such that there are no rainbow cycles. (I.e., **Rainbow Cycles are Forbidden.**) Such a coloring is a mixed hypergraph coloring in the sense of V. Voloshin: the hypergraph has for vertices the edges of G and two classes of hyperedges—the edge sets of the $K_{1,2}$ subgraphs of G , none of which are monochromatic in the coloring, and the edge sets of the cycles in G , none of which are rainbow in the coloring.

We make progress toward characterizing the graphs that have a PRCF coloring, and, for some of those that do, we determine the Voloshin spectrum of the graph G , $\{k \mid \text{there is a PRCF coloring of } G \text{ in which exactly } k \text{ colors appear}\}$.