

COMBINATORICS
SEMINAR

Connected Fair Detachments of Hypergraphs

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Abstract: Let G be a hypergraph whose edges are colored. A (u, n) -detachment of G is a hypergraph obtained by splitting a vertex u into n vertices, say u_1, \dots, u_n , and sharing the incident edges among the subvertices. A detachment is fair if the degree of vertices and multiplicity of edges are shared as evenly as possible among the subvertices within the whole hypergraph as well as within each color class. In this talk we solve an open problem from 1970s by finding necessary and sufficient conditions under which a k -edge-colored hypergraph G has a fair detachment in which each color class is connected. Previously, this was not even known for the case when G is an arbitrary graph. We exhibit the usefulness of our theorem by proving a variety of new results on hypergraph decompositions, and completing partial regular combinatorial structures.

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