Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, September 26@ STV 121

Speaker: Amin Bahmanian, Illinois State University

Connected Fair Detachments of Hypergraphs

Let $\mathcal{G}$ be a hypergraph whose edges are colored. An (α, n)-*detachment* of $\mathcal{G}$ is a hypergraph obtained by splitting a vertex α into n vertices, say $\alpha_1, \ldots, \alpha_n$, and sharing the incident hinges and 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 70s by finding necessary and sufficient conditions under which a k-edge-colored hypergraph $\mathcal{G}$ has a fair detachment in which each color class is connected. Previously, this was not even known for the case when $\mathcal{G}$ is an arbitrary graph (i.e. 2-uniform hypergraph). We exhibit the usefulness of our theorem by proving a variety of new results on hypergraph decompositions, and completing partial regular combinatorial structures.