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**Amin Bahmanian\***, Campus Box 4520, Normal, IL. *Connected Fair Detachments of Graphs and Hypergraphs.*

Let  $\mathcal{G}$  be a hypergraph whose edges are colored. An  $(\alpha, n)$ -*detachment* of  $\mathcal{G}$  is a hypergraph obtained by splitting a vertex  $\alpha$  into  $n$  vertices, say  $\alpha_1, \dots, \alpha_n$ , 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. We find necessary and sufficient conditions under which an 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. (Received July 14, 2019)