
Hypergraphs

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AMIN BAHMANIAN, University of Ottawa

2-edge-connected fair detachments of (≤ 3)-graphs

A detachment of a hypergraph is formed by splitting each vertex into one or more subvertices, and sharing the incident edges arbitrarily among the subvertices. Given a hypergraph F whose edges are of size at most 3, we provide necessary and sufficient conditions for the existence of a fair detachment G of F in which each color class is 2-edge-connected, which generalizes Nash-Williams' Theorem. Then we find 2-edge-connected factorizations for complete 3-uniform hypergraphs which generalizes Baranyai's Theorem restricted to 3-uniform hypergraphs.

ANDRZEJ CZYGRINOW, Arizona State University

Loose cycles in 3-uniform hypergraphs

Let H be a 3-uniform hypergraph on n vertices and let C_k denote a loose cycle on k vertices. In this talk, we will discuss lower bounds for the minimum co-degree of H that guarantee the existence of spanning sub-hypergraphs of H consisting of loose cycles. In particular, using the stability approach, we will give a tight minimum co-degree bound for the existence of a C_4 -factor, provided n is sufficiently large.

SHONDA GOSSELIN, University of Winnipeg

Cyclic decompositions of complete and complete multipartite uniform hypergraphs

A decomposition of a complete uniform hypergraph is *cyclic* if the parts are permuted transitively by a permutation of the vertex set. If there are t parts in the decomposition, each part is called a *t-complementary hypergraph*. We characterize the cycle type of the associated permutations, and consequently determine the feasible orders of a *t-complementary k-uniform hypergraph*, and an algorithm for generating all of these structures of a given order. We also construct cyclic partitions of complete multipartite uniform hypergraphs.

Joint work with A. Pawel Wojda and Artur Szymanski, AGH University of Science and Technology, Krakow, Poland.

IMDADULLAH KHAN, Umm Al-Qura University

Perfect matchings in uniform hypergraph with large vertex degree

A perfect matching in a 3-uniform hypergraph on $n = 3k$ vertices is a subset of $\frac{n}{3}$ disjoint edges. We prove that if H is a large 3-uniform hypergraph on $n = 3k$ vertices such that every vertex belongs to more than $\binom{n-1}{2} - \binom{2n/3}{2}$ edges, then H contains a perfect matching. We also show that if H is a large 4-uniform hypergraph on $n = 4k$ vertices such that every vertex belongs to more than $\binom{n-1}{3} - \binom{3n/4}{3}$ edges, then H contains a perfect matching. Both of these bounds are tight.

MATEJA SAJNA, University of Ottawa

Eulerian-type properties of hypergraphs

In this talk, we discuss generalization of concepts like walk, trail, and path from graphs to hypergraphs, and in particular, the problem of existence of Euler tours in hypergraphs. This is joint work with Amin Bahmanian.