Hypergraphs

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Forbidden Berge hypergraphs

Joint work with Santiago Salazar. A *simple* matrix is a (0,1)-matrix with no repeated columns. For a (0,1)-matrix F, we say that a (0,1)-matrix A has F as a *Berge hypergraph* if there is a submatrix B of A and some row and column permutation of F, say G, with $G \leq B$. Letting $||A||$ denote the number of columns in A, we define the extremal function $Bh(m, F) = \max\{||A|| : A \text{ is an } m\text{-rowed simple matrix with no Berge hypergraph } F\}$. We determine the asymptotics of $Bh(m, F)$ for all 3- and 4-rowed F and most 5-rowed F. For certain F, this becomes the problem of determining the maximum number of copies of K_r in a m-vertex graph that has no $K_{s,t}$ subgraph, a problem studied by Alon and Shikhelman.

AMIN BAHMANIAN, Illinois State University

On The Existence of Generalized Designs

A set S of q-subsets of an n-set X is a design with parameters (n, q, r, λ) if every r-subset of X belongs to exactly λ elements of S. In other words, a design with parameters (n, q, r, λ) is an n-vertex q-uniform hypergraph in which every r-subset of the vertex set belongs to exactly λ edges. The existence of a design with parameters (n, q, r, λ) is equivalent to a K_q^r-decomposition of λK_n^r (the complete λ-fold r-uniform hypergraph of order n). By Keevash's Theorem (2014), λK_n^r can be decomposed into K_q^r when some obvious divisibility conditions are satisfied and n is sufficiently large. In this talk, I will discuss a "multipartite" version of Keevash's Theorem.

Keywords: hypergraphs, designs, generalized designs, multipartite, amalgamation, detachment

ANDRZEJ CZYGRINOW, Arizona State University

Tight minimum degree condition for tiling a 3-graph with loose cycles

Let C_t denote the loose cycle on t vertices, the 3-uniform hypergraph obtained from a graph cycle C on $t/2$ vertices by inserting a new vertex v_e for every edge $e \in C$. For a 3-uniform hypergraph H let $\delta(H) := \min_{v \in V(H)} |N(v)|$ denote the minimum degree of H. We will give a tight condition for $\delta(H)$ which guarantees that a large enough 3-uniform hypergraph H on $n \in tZ$ vertices has n/t vertex disjoint copies of C_t. This is a joint work with R. Oursler.