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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