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Cover-free families on hypergraphs

Cover-free families, also called superimposed codes, are widely studied combinatorial objects used in combinatorial group testing and in many applications in cryptography and communications. A d -CFF(t, n) is a $t \times n$ incidence matrix of a set system where no set is contained in the union of up to d other sets. Cover-free families are used for solving the non-adaptive group testing problem: find a set of up to d defective items among n items, by testing them in pre-specified groups corresponding to rows of the matrix (tests). The objective is to minimize the number t of tests.

In this talk, we consider cover-free families on hypergraphs, which are generalizations of cover-free families used in applications where the possible sets of defective items are specified by the edges of a hypergraph. The traditional group testing problem is the special case where the edges of the hypergraph are all d -subsets of an n -set. We discuss recent constructions and our ongoing research on this topic.