Some Applications of Incidence Matrices of t-subsets and Hypergraphs

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Given a set $\mathcal{H}$ of t-uniform hypergraphs (possibly complete hypergraphs), we consider the 0-1 incidence matrices N with rows corresponding to all t-subsets of a v-set and columns corresponding to the subhypergraphs of the complete t-uniform hypergraph on the v points that are isomophic to a member of $\mathcal{H}$. We are interested in the p-ary code generated by the rows of N and the convex cone generated by the columns of N. Applications are given to a zero-sum Ramsey-type problem modulo 2 and to inequalities concerning t-wise balanced designs.

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