

Decomposition of regular hypergraphs

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Abstract

An r -block is a $0, 1$ -matrix in which every row has sum r . Let S_n be the set of pairs (k, l) such that the columns of any $(k+l)$ -block with n rows split into a k -block and an l -block. We determine S_n for $n \leq 5$. In particular, $S_3 = \{(k, l) : 2 \mid kl\}$, $S_4 = \{(k, l) : (6 \mid k \text{ or } l) \text{ and } (1 \notin \{k, l\})\}$, and $S_5 = \{(k, l) : 11 \neq \min\{k, l\} > 7 \text{ and each value in } \{3, 4, 5\} \text{ divides } k \text{ or } l\}$. The problem arose from a list-coloring problem in digraphs and is a refinement of the notion of indecomposable hypergraphs. This is joint work with Douglas B. West.