

Hypergraphs with minimum positive uniform Turán density

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Determining Turán densities in the setting of k -uniform hypergraphs is a challenging problem, even the Turán density of the complete 3-uniform 4-vertex hypergraph is not known. Since the edges in extremal constructions for Turán problems are often distributed in a highly non-uniform way, already Erdős and Sós suggested to study the notion of a uniform Turán density of hypergraphs, which requires the edges of the host hypergraph to be distributed uniformly. Reiher, Rödl and Schacht showed that the uniform Turán density of every 3-uniform hypergraph is either 0 or at least $1/27$, and asked whether there exist 3-uniform hypergraphs with uniform Turán density equal or arbitrarily close to $1/27$. We construct 3-uniform hypergraphs with uniform Turán density equal to $1/27$. In particular we give a sufficient criterion for a 3-uniform hypergraph to have uniform Turán density equal to $1/27$. This is joint work with Daniel Král' and Ander Lamaison.