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Approximate Steiner triple systems of large girth

A Steiner triple system of order n is a set of triples in an n -set such that every pair is contained in exactly one triple. Erdős conjectured in 1973 that for fixed g and any sufficiently large ‘admissible’ order n , there exists a Steiner triple system of order n with girth at least g , meaning that there are no j points which span at least $j-2$ triples for all $3 < j < g$. We motivate this notion of sparseness and discuss the state of the art of the conjecture. Our contribution is an approximate solution using probabilistic methods.

The talk is based on joint work with Daniela Kühn, Allan Lo and Deryk Osthus.