The Extremal Number of Tight Cycles

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Abstract: A tight cycle in an $r$-uniform hypergraph $H$ is a sequence of $\ell \geq r+1$ vertices $x_1, \ldots, x_\ell$ such that all $r$-tuples $\{x_i, x_{i+1}, \ldots, x_{i+r-1}\}$ (with subscripts modulo $\ell$) are edges of $H$.

An old problem of V. Sós, also posed independently by J. Verstraëte, asks for the maximum number of edges in an $r$-uniform hypergraph on $n$ vertices which has no tight cycle. Although this is a very basic question, until recently, no good upper bounds were known for this problem for $r \geq 3$. In my talk, I will present a brief outline of the proof of the upper bound $n^{r-1+o(1)}$, which is tight up to the $o(1)$ error term. This is based on a joint work with Benny Sudakov.

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