

Extremal edge coloring problems

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Joint work with Hanno Lefmann, Vojtěch Rödl and Mathias Schacht.

For graphs F and G and an integer r let $c_{r,F}(G)$ denote the number of r -colorings of the edges of G with no monochromatic copy of F and let $c_{r,F}(n) = \max_{G \in \mathcal{G}_n} c_{r,F}(G)$, where the maximum runs over all graphs on n vertices. Moreover, let $ex(n, F)$ be the usual *extremal* or *Turán function*.

Yuster showed that $c_{2,K_3}(n) = 2^{ex(n,K_3)}$ and Alon, Balogh, Keevash and Sudakov generalized this result to arbitrary cliques and $r = 2, 3$. It was shown for sufficiently large n that if G is a graph on n vertices then $c_{r,K_k}(G) = r^{ex(n,K_k)}$ if and only if G is the Turán graph $T_{k-1}(n)$.

We study generalizations of this problem to k -uniform hypergraphs.