



Ramsey-Turán-type of extremal problems

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Abstract

Many classical results in extremal graph theory provide sufficient conditions for the appearance of a certain structure. For example, the fundamental theorem of Ramsey states that one can find a monochromatic clique of a given size in any edge-coloring of a sufficiently large graph. Another example is Turán theorem which determines the maximum size of a graph without a fixed size clique. The extremal example for this theorem is Turán graph, an n -vertex complete k -partite graph where all partite sets have size $\lfloor n/k \rfloor$ or $\lceil n/k \rceil$. Motivated by the fact that the Turán graph has linear-sized independent sets, Erdős and Sós initiated the so-called Ramsey-Turán theory, where they studied the maximum size of an H -free graph G with the additional condition that $\alpha(G) = o(|G|)$. Here, we will consider the Ramsey-Turán variation of some classical results, whose extremal graphs are close to the Turán graph. In particular, one of the results is the following Ramsey-Turán variation of the Corrádi-Hajnal theorem: every n -vertex graph G with $\alpha(G) = o(n)$ and $\delta(G) \geq (1/2 + o(1))n$ has a triangle factor. This bound is asymptotically best possible.

(This is a joint work partly with Jozsef Balogh and Hong Liu, and partly with Jozsef Balogh and Theodore Molla.)

Monday, **5 Mehr 1395** (26 September 2016), **15:00-16:00**
Room **317**, Department of Mathematical Sciences

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