

A step towards a general density Corrádi-Hajnal Theorem

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Abstract

For a nondegenerate r -graph F , large n , and t in the regime $[0, c_F n]$, where $c_F > 0$ is a constant depending only on F , we present a general approach for determining the maximum number of edges in an n -vertex r -graph that does not contain $t + 1$ vertex-disjoint copies of F . In fact, our method results in a rainbow version of the above result and includes a characterization of the extremal constructions. Our approach applies to many well-studied hypergraphs (including graphs) such as the edge-critical graphs, the Fano plane, the generalized triangles, hypergraph expansions, and hypergraph books. Our results extend an old result of Simonovits and Moon on complete graphs and can be viewed as a step towards a general density version of the classical Corrádi–Hajnal Theorem. (Join work with Heng Li, Xizhi Liu, Long-Tu Yuan and Yixiao Zhang).

Keywords: Hypergraph Turán problems, the Corrádi-Hajnal Theorem, F -matching, stability, vertex-extendability.