RAINBOW TURÁN PROBLEMS[1]

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One of the central topics in extremal graph theory, known as the Turán problem, is to determine the maximum number of edges of a graph on n vertices that does not contain a copy of a given graph F as a subgraph. Equivalently, the minimum number of edges that forces the existence of F as a subgraph.

In a rainbow version of this problem, for an integer $c \geq 1$ we consider a collection of c graphs $\mathcal{G} = (G_1, \ldots, G_c)$ on a common vertex set, thinking of each graph as edges in a distinct color. We want to force the existence of a rainbow copy of F in $\mathcal{G}$ by having a large number of edges in each graph.

In this talk we present a solution to the problem for directed graphs without rainbow triangles and stars for any number of colors.

References

[1] S. Babiński, A. Grzesik, M. Prorok, Directed graphs without rainbow triangles, arXiv:2308.01461.

[2] D. Gerbner, A. Grzesik, C. Palmer, M. Prorok, Directed graphs without rainbow stars, arXiv:2402.01028.

[1] based on joint work with Sebastian Babiński, Dániel Gerbner, Andrzej Grzesik, Cory Palmer