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Directed graphs without rainbow stars

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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. Recently, a rainbow version of this problem has been intensively studied. In this variant, for an integer $c \geqslant 1$ 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 solve the problem for directed graphs without rainbow stars for any number of colors.

This is joint work with Dániel Gerbner, Andrzej Grzesik and Cory Palmer.