Sebastian Babiński
Jagiellonian University

Graphs without Rainbow Paths with 3 Edges

One of the essential problems in extremal graph theory is the Turán problem asking to determine the maximum possible number of edges in graphs not containing a copy of a forbidden subgraph F. Research on this topic, and its various generalizations, led to development of many important theorems and lemmas applied far beyond graph theory.

Among possible generalizations of the Turán problem there is its rainbow version, which recently attracted high attention and started to be often considered. A natural way of defining the rainbow Turán problem is as follows. For fixed integer $k \geq 1$ and graph F we consider graphs $G_1, G_2, \ldots, G_k$ on a common set of vertices (each of them being interpreted as edges in a different color). The problem is to determine the maximum possible number of edges in each color such that there does not appear a rainbow copy of graph F, i.e., a copy of F which each edge belongs to a different graph G_i.

In my talk I consider this rainbow version of the Turán problem for F being a path. I present the tight asymptotic bound for the number of edges in the case of a path with 3 edges and any number of colors $k \geq 1$.

This is joint work with Andrzej Grzesik.