

Edge-colorings of hypergraphs avoiding a rainbow expanded complete graph

Hanno Lefmann¹

¹ Technische Universität Chemnitz

For integers $\ell \geq k \geq 2$, the *expanded complete graph* $H_{\ell+1}^{(k)}$ is the k -uniform hypergraph obtained from the complete graph $K_{\ell+1}$ on $(\ell + 1)$ vertices by enlarging every edge by $(k - 2)$ new vertices. Pikhurko has solved the Turán problem for $H_{\ell+1}^{(k)}$: the unique extremal n -vertex k -uniform hypergraph for $H_{\ell+1}^{(k)}$ is the *balanced, ℓ -partite, complete, k -uniform (Turán) hypergraph* $T_{\ell}^{(k)}(n)$.

Here we consider a hypergraph version of an edge-coloring problem first considered by Erdős and Rothschild for graphs. For integers r and n , and a fixed graph F , the original problem concerned n -vertex graphs with the largest number of r -edge colorings that do not contain a monochromatic copy of F . The aim is to characterize those n -vertex k -uniform hypergraphs H with the largest number of (F, P) -free r -colorings.

For F being a complete graph and the *monochromatic pattern*, Alon, Balogh, Keevash and Sudakov showed for $r \in \{2, 3\}$ colors, that the (Turán) F -extremal graph is the only extremal graph for the edge-coloring problem. This is also the case here, where we consider $F = H_{\ell+1}^{(k)}$ and the *rainbow pattern*, where $r \geq r_0(k, \ell)$. This is joint work with Lucas de Oliveira Contiero, Carlos Hoppen and Knut Odernann.