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Anti-Ramsey Thresholds

We call an edge-coloring of a graph a k-coloring if it uses no more than k colors and k-bounded if it uses no color more than k times. We call a subgraph homogeneous if all of its edges are colored the same and heterogeneous if all of its edges are colored differently.

A classical Ramsey theorem states that for every k and n there exists an m such that any k-coloring of the edges of K_m contains a homogeneous K_n. Rodl *et al.* proved the following anti-Ramsey theorem: for every k and every n there exists an m such that any k-bounded coloring of the edges of K_m contains a heterogeneous K_n.

Let H be a fixed connected graph that contains a cycle. In this talk we establish the threshold for the property that every k-bounded coloring of the random graph $G_{n,p}$ has a heterogenous copy of H. We also discuss the behavior of the probability that $G_{n,p}$ has this property for p close to the threshold and pose a conjecture for the threshold when H is a tree.

This is joint work with Alan Frieze, Oleg Pikhurko and Cliff Smyth.