

New Ramsey Multiplicity Bounds and Search Heuristics

Olaf Parczyk

We present several new improved and tight asymptotic bounds relating both to the minimum number of monochromatic cliques contained in any edge-coloring of a complete graph as well as the minimum number of cliques in graphs with bounded independence number. Most notably, we present the first improvement on the upper bound of the K_4 and K_5 Ramsey multiplicity in more than 20 years and introduce a notion of off-diagonal Ramsey multiplicity. The upper bounds are established through graph and Cayley graph constructions found through computer search heuristics.

This is joint work with Sebastian Pokutta, Christoph Spiegel, and Tibor Szabó.