An improved upper bound for the (5,5)-coloring number of K_n

Alex Cameron, Vanderbilt University; Emily Heath*, UIUC

A (p, q)-coloring of a graph G is an edge-coloring of G in which each p-clique contains edges of at least q distinct colors. We denote by $f(n, p, q)$ the minimum number of colors needed for a (p, q)-coloring of the complete graph K_n. In this talk, we will describe an explicit $(5, 5)$-coloring of K_n which proves that $f(n, 5, 5) \leq n^{1/3+o(1)}$ as $n \to \infty$, improving the best known probabilistic upper bound of $O(n^{1/2})$ given by Erdős and Gyárfás.

Keywords: (p, q)-coloring, edge coloring, Ramsey theory

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