

1135-05-813

**Alex Cameron\***, acamer4@uic.edu, and **Emily Heath**, eheath3@illinois.edu. *A (5, 5)-coloring of  $K_n$  with few colors.*

For fixed integers  $p$  and  $q$ , let  $f(n, p, q)$  denote the minimum number of colors needed to color all of the edges of the complete graph  $K_n$  such that no clique of  $p$  vertices spans fewer than  $q$  distinct colors. Any edge-coloring with this property is known as a  $(p, q)$ -coloring. We construct an explicit  $(5, 5)$ -coloring that shows that  $f(n, 5, 5) \leq n^{1/3+o(1)}$  as  $n \rightarrow \infty$ . This improves upon the best known probabilistic upper bound of  $O(n^{1/2})$  given by Erdős and Gyárfás, and comes close to matching the best known lower bound  $\Omega(n^{1/3})$ . (Received September 14, 2017)