

A Happy Coloring Theorem

Jonathan Beagley, George Mason University, Fairfax VA – 22030

Abstract

In 1935, Paul Erdos and George Szekeres introduced a problem of planar point sets in general position (no three on a line): find the least integer $N(n)$ such that every planar point set of $N(n)$ points in general position contains n points that are convexly independent (form the vertex set of a convex n -gon). We introduce a related problem on the chromatic number of a graph of Morris, and show it has a finite upper bound. This graph on the copoints of planar point sets can be extended to abstract convex geometries. The cliques of this graph correspond to convexly independent sets, and the chromatic number is related to the order dimension of the lattice of convex sets.

Keywords: Euclidean plane, convex geometry, copoints.