Colourful Simplicial Depth

Tamon Stephen
tephen@merkur.math.uni-magdeburg.de
Department of Mathematics
Simon Fraser University
888 University Drive
Burnaby, BC V5A 1S6
CANADA

Abstract

Inspired by Barany's colourful Caratheodory theorem, we introduce a colourful generalization of Liu's simplicial depth. We examine the possible colourful depths of a core point in a colourful configuration of points. In particular, we exhibit a configuration with a core point of colourful depth $d^2 + 1$, and conjecture that this is minimal. We then prove a quadratic lower bound for this depth, and apply our results to the problem of bounding monochrome simplicial depth.