

Convex geometric hypergraphs

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A *convex geometric hypergraph* (or cgh for short) is an r -graph whose vertex set is a set Ω_n of n vertices in strictly convex position in the plane, and whose edges are viewed as convex r -gons with vertices from Ω_n . Extremal problems for convex geometric graphs (or eggs for short) have been studied extensively, going back to theorems in the 1930's on disjoint line segments in the plane and, more recently, convex geometric hypergraphs, and their connections to important problems in discrete geometry.

In this talk, we discuss some of the main results, background, and motivation in the area, including new results on ordered graphs and hypergraphs, and we also give a short proof of a generalization of the classical Erdős-Gallai Theorem on paths in graphs to so-called tight paths in hypergraphs. This result marks substantial progress towards a notoriously difficult conjecture of Kalai on tight trees in uniform hypergraphs.

Joint work with Z. Füredi, T. Jiang, A. Kostochka, and D. Mubayi