

Intersection patterns of geometric objects

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Not every graph can be obtained as the intersection graph of, say, straight-line segments (or other geometric objects) in the plane. These graphs have many nice structural properties. In particular, they contain much larger homogeneous subgraphs than guaranteed by Ramsey's theorem. It seems that this phenomenon is related to some basic topological facts, including the Borsuk-Ulam theorem. But does it have anything to do with algebra? We discuss this question and as a byproduct, we prove a conjecture of Erdős about distance distributions in d -space. Our proof uses Szemerédi's regularity lemma.

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