

Maximum Number of Almost Similar Triangles in the Plane

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A triangle T' is ε -similar to another triangle T if their angles pairwise differ by at most ε . Given a triangle T , $\varepsilon > 0$ and a natural number n , Bárány and Füredi asked to determine the maximum number of triangles $h(n, T, \varepsilon)$ being ε -similar to T in a planar point set of size n . We show that for almost all triangles T there exists $\varepsilon = \varepsilon(T) > 0$ such that $h(n, T, \varepsilon) = n^3/24(1 + o(1))$. Exploring connections to hypergraph Turán problems, we use flag algebras and stability techniques for the proof.

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