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Erdős, Paul; Lovász, László; Vesztergombi, K.

On the graph of large distances. (In English)

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Let S be a set of n points in the plane and let $d_1 > d_2 > \dots$ be the different distances determined by the set S . The graph $G(S, k)$ is considered whose vertex set is S and in which two vertices are adjacent if and only if their distance is at least k . The chromatic number $\chi(G(S, k))$ of $G(S, k)$ is studied. It is proved that for $n \geq 18k^2$ there is $\chi(G(S, k)) \leq 7$ and for $n > 25000k^2$ there is $\chi(G(S, k)) \leq 3$. Further the particular case is treated, when S is the set of vertices of a convex polygon. Then $\chi(G(S, k)) \leq 3k$ and the graph $G(S, k)$ has a vertex of degree at most $3k - 1$.

B.Zelinka

Classification:

05C15 Chromatic theory of graphs and maps

05C38 Paths and cycles

52A10 Convex sets in 2 dimensions (including convex curves)

Keywords:

point of the plane; distance in the plane; chromatic number