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Summary

ON CERTAIN DECOMPOSITION SETS OF THE PLANE

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The paper is concerned with the decompositions \mathbf{R} of the euclidean plane E_2 into the sets congruent with a given subset N of the straight line l , when $m = \text{card}(l - N) < 2^{\aleph_0}$. When such a decomposition exists, we say that N is a decomposition set of E_2 .

Let \mathfrak{N} be the set of the straight lines, in which elements of \mathbf{R} are contained. It is proved, that \mathfrak{N} consists of two subsets $\mathfrak{N}_1, \mathfrak{N}_2$, one of which consists of all straight lines parallel to a given direction, the other contains exactly m straight lines parallel to another direction (theorem 1).

In theorem 2 we prove that the following condition is necessary for N being a decomposition set of E_2 :

If ξ is a point of $l - N$, there exists a translation τ of l such that $\tau(l - N) \subset l - N$, $\xi \notin \tau(l - N)$. In the case $m = \aleph_0$ this condition is sufficient, but this is not the case for $m > \aleph_0$.