Configurations in sets of positive upper density in R^m

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Abstract

We use ergodic theoretic tools to solve a problem in geometric Ramsey theory. Let E be a measurable subset of R^m, with positive upper density. Let $V = \{0, v_1, \ldots, v_k\}$ be a subset of R^m. We show that for r large enough, we can find an isometric copy of rV arbitrarily close to E. This is a generalization of a theorem of Furstenberg, Katznelson and Weiss showing a similar property for $m = k = 2$.