

HARMONIC AND SPECTRAL ANALYSIS

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On the Euclidean distance graph

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Let E be a compact subset of \mathbb{R}^d , $d \geq 2$ of a given Hausdorff dimension. Let $\mathcal{G}_t(E)$ be a graph where the vertices are the points of E and two vertices are connected by an edge if $|x - y| = t$. A related problem in the realm of subsets of \mathbb{R}^d of positive upper Lebesgue density was and continues to be explored by Furstenberg, Katznelson, Lyall, Magyar, Weiss, Ziegler, and others. We are going to survey the current state of knowledge of the structure of this graph and describe some recent results, co-authored with Greenleaf, Magyar, Mkrtychyan, Shen and others.