Mathematics > Probability

Connectivity Threshold of Random Geometric Graphs with Cantor Distributed Vertices

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For connectivity of \emph{random geometric graphs}, where there is no density for underlying distribution of the vertices, we consider n i.i.d. \emph{Cantor} distributed points on $[0,1]$. We show that for this random geometric graph, the connectivity threshold R_{n}, converges almost surely to a constant $1-2\phi$ where $0 < \phi < 1/2$, which for standard Cantor distribution is 1/3. We also show that $\| R_n - (1 - 2 \phi) \|_1 \sim 2 \, C(\phi)\, n^{-1/d_{\phi}}$ where $C(\phi) > 0$ is a constant and $d_{\phi} := -{\log 2}/{\log \phi}$ is a the \emph{Hausdorff dimension} of the generalized Cantor set with parameter ϕ.

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