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Exact scaling for the mean first-passage time of random walks on a generalized pseudofractal web. (Chinese. English summary) Zbl 1274.60147

Summary: The scaling of the mean first-passage time (MFPT) for random walks on a generalized pseudofractal web (GPFW) with a trap is studied. A feature of the GPFW is that every existing edge produces finite nodes in each evolution step. Through the web construction, the exact scaling for the MFPT is obtained. The MPFT grows as a power-law function with the number of nodes in the large limit of network order. In addition, the efficiency of random walks on this kind of web can be improved through changing the network parameter. These results are generalizations of those derived for the pseudofractal web, which shed some lights on the analysis of random walks over various fractal networks.

MSC:

60G50 Sums of independent random variables; random walks
05C82 Small world graphs, complex networks (graph-theoretic aspects)

Keywords:

generalized pseudofractal web; random walk; mean first-passage time