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k-connectivity in random graphs. (In English)

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Motivated by applications of evolving random graphs as models for phase transitions in physical systems, problems were posed [the second author, k- connectivity and cycles in random graphs with applications, Notes from N. Y. Graph Theory Day I, 3-5 (1980)] concerning threshold functions for the appearance of giant k-connected subgraphs in random graphs, random f- graphs (i.e. random graphs with maximum vertex degree f), and random lattice-graphs (i.e. random graphs restricted to be embeddable in some lattice-graph).
We present here a solution to the problem for the first two classes of random graphs and for all $k = 1, 2....$ The problem concerning random lattice-graphs remains open.

Classification:
05C80 Random graphs
05C40 Connectivity

Keywords:
evolving random graphs; phase transitions; physical systems; threshold functions