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Percolation on random regular directed graphs

Let G be a random d -regular directed graph (i.e. the in-degree and out-degree of every vertex is d) and $p \in [0, 1]$. Delete each vertex (together with all incident edges) with probability $1 - p$, independently of the other vertices. We denote the resulting random graph by G_p . We prove that for $p > (1 + \epsilon)^{\frac{1}{d}}$, G_p asymptotically almost surely contains a strongly connected subgraph of size $\Omega(n)$. Also, for $p < (1 - \epsilon)^{\frac{1}{d}}$, asymptotically almost surely every strongly connected subgraph of G_p has size $O(\log(n))$. Joint work with Jane Gao.