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A rainbow connectivity threshold for random graph families

Given a family $\mathcal{G}$ of graphs on a common vertex set X, we say that $\mathcal{G}$ is *rainbow connected* if for every vertex pair $u, v \in X$, there exists a path from u to v that uses at most one edge from each graph of $\mathcal{G}$. We consider the case that $\mathcal{G}$ contains s graphs, each sampled randomly from $G(n, p)$, with $n = |X|$ and $p = \frac{c \log n}{sn}$, where $c > 1$ is a constant. We show that there exists a threshold of at most three consecutive integer values such that when s is greater than or equal to this threshold, $\mathcal{G}$ is a.a.s. rainbow connected, and when s is below this threshold, $\mathcal{G}$ is a.a.s. not rainbow connected. This is joint work with Bojan Mohar.