Coloring the edges of a random graph without monochromatic giant components

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Abstract

Our goal is to color the edges of a random graph $G_{n,m}$ (a graph drawn uniformly at random from all graphs on n vertices with exactly m edges) with a fixed number r of colors such that no color class induces a component of size $\Omega(n)$ – a so called 'giant component'. We prove that for every $r \geq 2$, the threshold for the existence of such a coloring coincides with the threshold for r-orientability found by Cain, Sanders, and Wormald (SODA 07), and independently by Fernholz and Ramachandran (SODA 07).