

The clique chromatic number of random graphs

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The clique chromatic number of a graph is the smallest number of colors in a vertex coloring such that no maximal clique (with respect to inclusion) is monochromatic. In 2016, McDiarmid, Mitsche and Prałat analyzed the clique chromatic number of the Erdős-Rényi random graph $G(n, p)$. While they characterized this parameter for most values of p , they found out that around $p \approx n^{-1/2}$ the clique chromatic number of the random graph $G(n, p)$ changes by $n^{\Omega(1)}$ when the edge probability p increases by $n^{o(1)}$ but left the details of this surprising “jump” phenomenon as an open problem. In this talk, we will attempt to summarize the ideas from the original analysis of the clique chromatic number and introduce new ideas explaining this sharp transition. The talk is based on a joint work with Dieter Mitsche and Lutz Warnke.