

Abstract

We show that a random 4-regular graph asymptotically almost surely (a.a.s.) has chromatic number 3, a random 6-regular graph a.a.s. has chromatic number 4, and that the chromatic number of a random d -regular graph for other d between 4 and 10 inclusive is a.a.s. restricted to a range of two integer values: $\{3, 4\}$ for $d = 5$, $\{4, 5\}$ for $d = 7, 8, 9$, and $\{5, 6\}$ for $d = 10$. The proof uses efficient algorithms which a.a.s. colour these random graphs using the number of colours specified by the upper bound. These algorithms are analysed using the differential equation method, including an analysis of certain systems of differential equations with discontinuous right hand sides.