

The degree sequence of the random graph & asymptotic enumeration of regular graphs

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We show that the distribution of the degree sequence of $G(n, m)$ can be approximated by a sequence of n independent binomial variables $\text{Bin}(n-1, p)$ for a large range of p . This covers the range left open by previous work. In fact, we prove asymptotic formulae for the number of graphs of a given degree sequence, which implies the result about the degree sequence of the random graph. These formulae were conjectured in 1990 and 1997. In particular, we provide an asymptotic formula for the number of d -regular graphs for all d . We obtain similar results for bipartite graphs and digraphs without loops. This is joint work with Nick Wormald.