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Random Graphs with Specified Degrees

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There is a large literature on the structure of random graphs of various types. In this talk we consider the case of graphs chosen uniformly at random from the set of simple graphs with a given degree sequence. Since a basic tool is the probability of a specified subgraph occurring, we focus on that question. Most previous work focussed on the case of low degree: $O(\sqrt{\log n}\,)$ by Bollobás (1980) and $o(n^{1/3})$ by McKay (1981, 1985). Recently the method of switchings was used by Krivelevich, Sudakov, Wormald and Vu (2001, 2008) to obtain some partial results for higher degrees in the regular case. In the present work, we use analytic methods to extend these results to subgraphs of dense graphs.