GIANT COMPONENT IN RANDOM MULTIPARTITE GRAPHS WITH GIVEN DEGREE SEQUENCES

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We study the problem of the existence of a giant component in random multipartite graphs. We consider a random multipartite graph with p parts generated according to a given degree sequence $n_i^{\mathbf{d}}$ which denotes the number of vertices in part i of the multipartite graph with degree given by the vector $\mathbf{d}$. We assume that the degree sequence converges to a probability distribution. Under certain additional regularity assumptions, we characterize the conditions under which, with high probability, there exists a component of linear size. We also characterize the size of the giant component when it exists. We use the exploration process of Molloy and Reed combined with techniques from the theory of multidimensional Galton-Watson processes to establish this result.