On eigenvalues and singular values of adjacency matrices of regular directed random graphs.

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We consider adjacency matrices of random d-regular directed graphs, that is, matrices uniformly distributed on the set of all 0/1-valued $n \times n$ matrices such that each row and each column of a matrix has exactly d ones. We are interested in invertibility of such matrices, in quantitative estimates of their singular values, in the structure of their kernels, and in convergence of their empirical spectral distributions to the circular law as n and d tends to infinity. This is a joint work with A. Litvak, K. Tikhomirov, N. Tomczak-Jaegermann, and P. Youssef.