Alexander Litvak

University of Alberta, Edmonton, AB, Canada

Title: Circular law for sparse random regular digraphs.

Abstract: Fix a constant $C \ge 1$ and let d = d(n) satisfy $d \le \ln^C n$ for every large integer n. Denote by M_n the adjacency matrix of a uniform random directed d-regular graph on n vertices. We show that, as long as $d \to \infty$ with n, the empirical spectral distribution of the appropriately rescaled matrix M_n converges weakly in probability to the circular law. This result, together with an earlier work of Cook, settles the problem of weak convergence of the empirical distribution in directed d-regular setting with the degree tending to infinity. As a crucial element of our proof, we develop a technique of bounding intermediate singular values of A_n , based on studying random normals to the rowspaces. This is a joint work with A. Lytova, K. Tikhomirov, N. Tomczak-Jaegermann, and P. Youssef.