מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Geometric Functional Analysis and Probability Seminar

Room 261 ,Ziskind Building
on Thursday, Dec 03, 2015
at 11:00

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Eigenvalue confinement and spectral gap for random simplicial complexes

Abstract:

We consider the adjacency operator of the Linial-Meshulam model for random simplicial complexes on n vertices, where each d-cell is added independently with probability p to the complete $(d-1)$-skeleton. From the point of view of random matrix theory, the adjacency matrix is a sparse, self adjoint random matrix with dependent entries. Under the assumption $np(1-p)>> log^4 n$, we prove that the spectral gap between the $\binom{n-1}{d}$ smallest eigenvalues and the remaining $\binom{n-1}{d-1}$ eigenvalues is $np-2\sqrt{dnp(1-p)}(1+o(1))$ with high probability. This estimate follows from a more general result on eigenvalue confinement. In addition, we prove that the global distribution of the eigenvalues is asymptotically given by the semicircle law. Based on a joint work with Antti Knowles.