

Random matrices with independent log-concave rows/columns.

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Abstract:

I will present some recent results concerning geometric properties of random matrices with independent rows/columns distributed according to a log-concave probability measure. In particular I will discuss the following topics:

1. Estimates on the operator norm of such matrices
2. Solution to the Kannan-Lovasz-Simonovits problem (i.e. providing a condition on a matrix with independent rows to be an almost isometry)
3. Restricted isometry property for matrices with independent columns and neighbourliness of random polytopes with vertices sampled from isotropic convex bodies
4. Estimates on the smallest singular value of a square matrix (if time permits).

While focusing on the probabilistic part of the above problems I will try to indicate connections with geometry of convex bodies and log-concave measures as well as some geometric motivations and applications (e.g. sampling and computing the volume of high dimensional convex bodies, compressed sensing). The talks will be based on joint work with O. Guedon, A. Litvak, N. Tomczak-Jaegermann and A. Pajor.