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Small ball probability for the condition number of random matrices

Let A be an n by n random matrix with i.i.d. entries of zero mean, unit variance and a bounded subgaussian moment. We show that the smallest singular value of A , rescaled by the square root of n , is a subgaussian random variable. Although the statement can be obtained as a combination of known results and techniques, it was not noticed in the literature before. As a key step of the proof, we apply estimates for the intermediate singular values of A obtained (under some additional assumptions) by Hoi Nguyen. The talk is based on a joint work with Alexander Litvak and Nicole Tomczak-Jaegermann.