Spectre de grandes matrices aléatoires perturbées

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Résumé

We study the effect of a perturbation on the spectrum of a Hermitian matrix by a random matrix with small operator norm and whose entries in the eigenvector basis of the first one were independent, centered and with a variance profile. This is carried out through perturbative expansions of various types of spectral laws of the considered perturbed large matrices. First, we demonstrate different perturbative expansions of the empirical spectral measure in the cases of the perturbative regime and the semi-perturbative regime and highlight well known heuristic patterns in physics, as the transition between semi-perturbative and perturbative regimes. Secondly, we prove, through a perturbative expansion of spectral measures associated to the state defined by a given vector, a perturbative expansion of the coordinates of the eigenvectors of the perturbed matrices.

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