

Outliers of perturbations of banded Toeplitz matrices

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This is an ongoing work in collaboration with Charles Bordenave and Mireille Capitaine. Toeplitz matrices are non-normal matrices whose spectral analysis in high dimensions is well understood. The spectrum of these matrices is in particular very sensitive to small perturbations. In this talk, we will focus on banded Toeplitz matrices, whose symbol is given by a Laurent polynomial, and which are perturbed by a random matrix. The goal is to describe “outliers”, which are eigenvalues that lie outside the support of the limiting distribution of the perturbed matrix as the dimension tends to infinity. The presence of outliers in some region of the complex plane is specifically related to the winding number of the curve determined by the symbol in that region.

Orateur: CHAPON, François