

Outliers of Perturbations of Banded Toeplitz Matrices

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Let $T_n(\mathbf{a})$ be a $n \times n$ Toeplitz matrix with symbol $\mathbf{a}: \mathbb{S}^1 \rightarrow \mathbb{C}$ given by the Laurent polynomial $\mathbf{a}(\lambda) = \sum_{k=-r}^s a_k \lambda^k$. We consider the matrix $M_n = T_n(\mathbf{a}) + \sigma \frac{X_n}{\sqrt{n}}$, where $\sigma > 0$ and X_n is some noise matrix whose entries are centered i.i.d. random variables of unit variance. When n goes to infinity, the empirical spectral distribution of M_n converges towards a probability measure β_σ on \mathbb{C} . The objective of this talk is to describe, when n is large, the eigenvalues of M_n in closed regions of $\mathbb{C} \setminus \text{support}(\beta_\sigma)$ which we will call the outlier eigenvalues. This is a joint work with Charles Bordenave and François Chapon.

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