Department of Mathematics Colloquium

Random Perturbation of Toeplitz Matrices

Charles Bordenave

Institut de Mathématiques de Marseille
CNRS

Abstract: Toeplitz matrices form a rich and ubiquitous class of possibly non-normal matrices. Their asymptotic spectral analysis in high dimension is well-understood, as illustrated by the strong Szegö limit theorem for Toeplitz determinants. The spectra of these matrices are notoriously highly sensitive to small perturbations. In this talk, we explore the spectrum of a banded Toeplitz matrix perturbed by a random matrix in the asymptotic of high dimension. We show that the outlier eigenvalues are driven by a low-dimensional random analytic matrix field alongside an explicit deterministic matrix that captures the algebraic structure of the resonances responsible for the outlier eigenvalues. Along the way, we present new variations around the strong Szegö limit theorem. The talk is based on a joint work with Mireille Capitaine and François Chapon.

Date: Wednesday, April 8, 2026
Time: 15:40 (Ankara)
Place: ZOOM and video conference in Mathematics Seminar Room, SA-141

To request the event link, please contact `gokhan.yildirim@bilkent.edu.tr`

Light refreshments will be served prior to the talk.