Non-Hermitian random matrices beyond the circular law

Abstract:

It is a classical result of random matrix theory that under certain assumptions the empirical eigenvalue distribution of Hermitian polynomials of random matrices with i.i.d. entries converges to a limit described by free probability. In many cases this convergence even holds down to local scales, i.e. the spectral measure converges to an empirical density on all scales above the typical eigenvalue spacing as the dimension of the matrix grows to infinity. While no results on a similar level of generality exist for non-Hermitian polynomials, progress has been made in recent years. In this talk I will discuss techniques to prove local laws beyond the i.i.d. case and will present a novel result for a specific ensemble of non-Hermitian random matrices.