Abstract

Random Systems

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Edge Universality for non-Hermitian Random Matrices

We consider large non-Hermitian real or complex random matrices X with independent, identically distributed centred entries. We prove that their local eigenvalue statistics near the spectral edge, the unit circle, coincide with those of the Ginibre ensemble, i.e. when the matrix elements of X are Gaussian. Previously non-Hermitian edge universality had only been established under the condition of four matching moments [Tao, Vu (2015)]. The proof relies on the recently obtained optimal local law in the cusp regime of Hermitian random matrices, and a supersymmetric estimate on the least singular value of shifted Ginibre ensembles. This estimate on the least singular value improves the classical smoothing bound from [Sankar, Spielman, Teng (2006)] in the transitional edge regime.