
YURIY NEMISH, IST Austria

Local laws for polynomials of Wigner matrices

We consider general self-adjoint polynomials in several independent random matrices whose entries are centered and have constant variance. Under some numerically checkable conditions, we establish the optimal local law, i.e., we show that the empirical spectral distribution on scales just above the eigenvalue spacing follows the global density of states which is determined by free probability theory. First, we give a brief introduction to the linearization technique that allows to transform the polynomial model into a linear one, which has simpler correlation structure but higher dimension. After that we show that the local law holds up to the optimal scale for the generalized resolvent of the linearized model, which also yields the local law for polynomials.

This is a joint work with Laszlo Erdős and Torben Krüger.