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A family of fat-tail random matrix ensemble JINMYUNG CHOI, K.A. MUTTALIB — We present a family of novel fat-tail random matrix ensembles characterized by a parameter λ. We show that the eigenvalue densities of the ensembles exhibit a power law distribution. In particular, for $\lambda > 1$, the tail of the distribution is bounded, whereas for $\lambda < 1$, the distribution has a fat tail. In the limit $\lambda = 1$, the ensemble corresponds to the well-established critical ensemble. We evaluate the eigenvalue correlations in terms of a novel family of orthogonal polynomials that are generalizations of the q-Hermite polynomials. We show that the two-level correlation of the novel fat-tail ensemble is qualitatively different from that of either the Gaussian or the critical ensemble.

Jinmyung Choi

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