



Mathematical Physics

Induced Ginibre ensemble of random matrices and quantum operations

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A generalisation of the Ginibre ensemble of non-Hermitian random square matrices is introduced. The corresponding probability measure is induced by the ensemble of rectangular Gaussian matrices via a quadratisation procedure. We derive the joint probability density of eigenvalues for such induced Ginibre ensemble and study various spectral correlation functions for complex and real matrices, and analyse universal behaviour in the limit of large dimensions. In this limit the eigenvalues of the induced Ginibre ensemble cover uniformly a ring in the complex plane. The real induced Ginibre ensemble is shown to be useful to describe statistical properties of evolution operators associated with random quantum operations, for which the dimensions of the input state and the output state do differ.

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