Wigner and Wishart ensembles for sparse Vinberg models

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Abstract

Vinberg cones and the ambient vector spaces are important in modern statistics of sparse models. The aim of this paper is to study eigenvalue distributions of Gaussian, Wigner and covariance matrices related to growing Vinberg matrices. For Gaussian or Wigner ensembles, we give an explicit formula for the limiting distribution. For Wishart ensembles defined naturally on Vinberg cones, their limiting Stieltjes transforms, support and atom at 0 are described explicitly in terms of the Lambert–Tsallis functions, which are defined by using the Tsallis q-exponential functions.

Keywords Eigenvalue distributions · Covariance matrices · Wigner matrices · Homogeneous cones · Vinberg cones · q-Exponential · Lambert–Tsallis functions

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