



Mathematical Physics

# Asymptotic Integral Kernel for Ensembles of Random Normal Matrix with Radial Potentials

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(Submitted on 23 Jun 2011)

We use the steepest descents method to study the integral kernel of a family of normal random matrix ensembles with eigenvalue distribution  $P_{\{N\}}(z_{\{1\}}, \dots, z_{\{N\}}) = Z_{\{N\}}^{-1} e^{-N \sum_{i=1}^N V_{\{\alpha\}}(z_{\{i\}})} \prod_{1 \leq i < j \leq N} |z_{\{i\}} - z_{\{j\}}|^2$  where  $V_{\{\alpha\}}(z) = |z|^{\alpha}$ ,  $z \in \mathbb{C}$  and  $\alpha \in ]0, \infty[$ . Asymptotic analysis with error estimates are obtained. A corollary of this expansion is a scaling limit for the  $n$ -point function in terms of the integral kernel for the classical Segal--Bargmann space.

Comments: 25 pages, 2 figures

Subjects: **Mathematical Physics (math-ph)**; Probability (math.PR)

MSC classes: 15B52, 42C05, 41A60

Cite as: [arXiv:1106.4858](#) [math-ph]

(or [arXiv:1106.4858v1](#) [math-ph] for this version)

## Submission history

From: Domingos Humberto Urbano Marchetti [[view email](#)]

[v1] Thu, 23 Jun 2011 23:11:04 GMT (105kb,D)

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