

Extreme points of the Vandermonde Determinant and Wishart Ensemble on Symmetric Cones

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(English)

Manuscript (preprint) (Other academic)**Abstract [en]**

In this paper we demonstrate the extreme points of the Wishart joint eigenvalue probability distributions in higher dimension based on the boundary points of the symmetric cones in Jordan algebras. The extreme of points of the Vandermonde determinant are defined to be a set of boundary points of the symmetric cones that occur in both the discrete and continuous part of the Gindikin set. The symmetric cones form a basis for the construction of the degenerate and non-degenerate Wishart ensembles in $\text{Herm}(m; \mathbb{C})$, $\text{Herm}(m; \mathbb{H})$, $\text{Herm}(3; \mathbb{O})$ denotes respectively the Jordan algebra of all Hermitian matrices of size $m \times m$ with complex entries, the skew field \mathbb{H} of quaternions, and the algebra \mathbb{O} of octonions.

Keywords [en]

Vandermonde Determinant, Jordan Algebras, Symmetric Cones, Wishart Joint Eigenvalue Distributions

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1. Extreme points of the Vandermonde determinant in numerical approximation, random matrix theory and financial mathematics