



A new framework for extending the Wishart distribution

Andriette Bekker*

Department of Statistics, University of Pretoria, Pretoria, South Africa – Andriette.bekker@up.ac.za

Mohammad Arashi

Shahrood University, Faculty of Mathematics, Shahrood, Iran– m-arashi-stat@yahoo.com

Janet van Niekerk

Department of Statistics, University of Pretoria, Pretoria, South Africa – janet.vanniekerk@up.ac.za

Abstract

The Wishart distribution and its generalizations are among the most prominent probability distributions in multivariate statistical analysis, arising naturally in applied research and as a basis for theoretical models. In this paper, we generalize the Wishart distribution utilizing a different approach that leads to the Wishart generator distribution with the Wishart distribution as a special case. Important statistical characteristics of the Wishart generator distribution are derived from the matrix theory viewpoint. Estimation is also touched upon as a guide for further research from the classical approach as well as from the Bayesian paradigm. The paper is concluded by giving applications of two special cases of this distribution in calculating the product of beta functions and astronomy.

Keywords: estimation; generator; eigenvalue; zonal polynomial.