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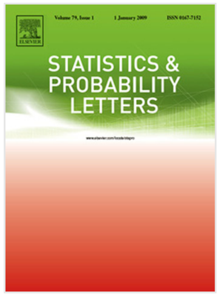

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A proof for the conjecture of characteristic function of the generalized skew-elliptical distributions

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Abstract

In the paper of Genton and Loperfido (Genton and Loperfido (2005) [1]), the authors introduced the multivariate generalized skew-elliptical distributions, which is a family of skewed distributions that contains the more familiar skew-normal and skew-Student-t distributions. In the same paper the authors conjectured the structure of the characteristic function of the proposed family of distributions. In this short letter we prove their conjecture.

Keywords: Characteristic function; Generalized skew elliptical distributions; Skewed distributions

1 Introduction

The family of the multivariate generalized skew-elliptical (GSE) distributions takes the following form (Genton and Loperfido (2005) [1])

$$f_{\mathbf{Y}}(\mathbf{y}) = 2\,|\Sigma|^{-1/2}\, g\left(\frac{1}{2}(\mathbf{y}-\mu)^T\Sigma^{-1}(\mathbf{y}-\mu)\right)\pi(\Sigma^{-1}(\mathbf{y}-\mu)),\ \ \mathbf{y}\in R^n. \quad (1)$$

Here $|\Sigma|^{-1/2}\, g\left(\frac{1}{2}(\mathbf{x}-\mu)^T\Sigma^{-1}(\mathbf{x}-\mu)\right)$ is a probability density function (pdf) of n-variate elliptical distribution $\mathbf{X} \backsim E_n(\mu,\Sigma,g)$, where μ is $n\times 1$ vector