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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  $\mathbf{X} \sim E_n(\mu, \Sigma, g)$ , where  $\mu$  is  $n \times 1$  vector

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