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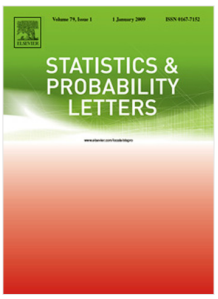

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A proof for the existence of multivariate singular generalized skew-elliptical density functions

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Abstract

We derive the density functions of multivariate singular generalized skew-elliptical distributions, present their characteristic function, and derive explicit formulas for the expectation and the covariance matrix. This letter generalizes results given in Díaz-García et al. (2002) and Young et al. (2016) about the existence of multivariate singular elliptical and multivariate singular skew-normal density functions, respectively.

Keywords: Affine subspace; Characteristic function; Generalized skew-elliptical distributions; High-dimensional data; Lebesgue measure; Pseudoinverse

1 Introduction and main results

The family of generalized skew-elliptical (GSE) distributions and its special members provide both, elegant and practical models for data with skewness (Loperfido (2001), Azzalini and Capitanio (2003), Nadarajah and Kotz (2003), Genton (2004), Wang et al. (2004), Genton and Loperfido (2005),

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