ESTIMATION OF A MULTIVARIATE BOX-COX TRANSFORMATION TO ELLIPTICAL SYMMETRY VIA THE EMPIRICAL CHARACTERISTIC FUNCTION

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Abstract. Let $\boldsymbol{X} = (X_1, X_2, \ldots, X_d)^t$ be a random vector of positive entries, such that for some $\boldsymbol{\lambda} = (\lambda_1, \lambda_2, \ldots, \lambda_d)^t$, the vector $\boldsymbol{X}^{(\boldsymbol{\lambda})}$ defined by $X_i^{(\lambda_i)} = (X_i^{\lambda_i} - 1)/\lambda_i$, $i = 1, \ldots, d$ is elliptically symmetric. We describe a procedure based on the multivariate empirical characteristic function for estimating the λ_i's. Asymptotic results regarding consistency of the estimators are given and we evaluate their performance in simulated data. In a one-dimensional setting, comparisons are made with other available transformations to symmetry.

Key words and phrases: Elliptically contoured distributions, empirical characteristic function, Box-Cox transformations.