

ON ESTIMATION IN MULTIVARIATE LINEAR CALIBRATION WITH ELLIPTICAL ERRORS

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Abstract. The estimation problem in multivariate linear calibration with elliptical errors is considered under a loss function which can be derived from the Kullback-Leibler distance. First, we discuss the problem under normal errors and give unbiased estimate of risk of an alternative estimator by means of the Stein and Stein-Haff identities for multivariate normal distribution. From the unbiased estimate of risk, it is shown that a shrinkage estimator improves on the classical estimator under the loss function. Furthermore, from the extended Stein and Stein-Haff identities for our elliptically contoured distribution, the above result under normal errors is extended to the estimation problem under elliptical errors. We show that the shrinkage estimator obtained under normal models is better than the classical estimator under elliptical errors with the above loss function and hence we establish the robustness of the above shrinkage estimator.

Key words and phrases: Elliptically contoured distribution, Kullback-Leibler distance, multivariate linear model, shrinkage estimator.