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A Measure of Multivariate Data Concentration

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Abstract

Volume ellipsoid and covariance determinant have been successfully used as multivariate data concentration measures. However, their computations are quite cumbersome especially when the data sets are of high dimension. In this paper we present an analytical approach of vector variance as an alternative measure which can eliminate this obstacle and, in order to be able to use it in practical applications, we derive its asymptotic distributional properties. Its sensitivity to the change of covariance structure will be discussed.

Keywords: Commutation matrix, covariance determinant, vector covariance, vector variance, *vec* operator, volume ellipsoid.

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