A Multivariate Test for Location Based on Elliptical Depth

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Abstract

One of the fundamental concepts in the study of statistical depth is that the depth function should be invariant to the choice of coordinate system. Although this notion of affine-invariance is desirable, most of the current depth functions which satisfy this property are difficult to compute in high dimensions. In this paper, a statistical depth function based on random hyperellipses is proposed which is both affine-invariant and simple to compute in any practical dimension. We will discuss an affine-invariant, multivariate test for location based on this elliptical depth function. The test is applied to several examples from the literature. This is work with Bruce Brown and Fengjuan Xuan.