Statistics Seminar Series

Skew-Symmetric And Skew-Elliptical Distributions: A Trip Beyond Normality

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Thursday, April 24, 2003, 4:00-5:00pm

Mathematics and Computer Science (MCS) Building, Room 149

111 Cummington Street, Boston

Tea and Cookies at 3:30pm in MCS 153

Abstract: We define a general family of multivariate skew-symmetric distributions which includes generalized skew-elliptical distributions as a special case. In particular, it also includes the multivariate skew-normal, skew-t, skew-Cauchy, and skew-elliptical distributions. We show that any multivariate pdf admits a skew-symmetric representation and study several characteristics of this representation. We establish various invariance properties and links to chi-square distributions, which hold for quadratic forms in skew-symmetric random vectors. These properties imply that standard inferential methods might be misleading when applied to time series and spatial processes with skew-symmetric distributions. However, the same property is beneficial for inference from non-random samples. We also propose a semiparametric representation of skew-symmetric distributions by constructing an enumerable dense subset of skewing functions. This flexible family of distributions can capture skewness, heavy tails, and multimodality systematically. Moreover, it is straightforward to simulate pseudo-realizations from this family. This is an attractive property for applications requiring EM or MCMC implementations. We provide several examples and applications for illustration.

For directions and maps, please see *http://math.bu.edu/research/statistics/statseminar.html*.