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**Linear mixed models for multiple outcomes using extended multivariate skew- $t$  distributions.** (English) Zbl 1326.62010

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Summary: Multivariate outcomes with heavy skewness and thick tails often arise from clustered experiments or longitudinal studies. Linear mixed models with multivariate skew- $t$  (MST) distributions for the random effects and the error terms is a popular tool of robust modeling for such outcomes. However the usual MST distribution only allows a common degree of freedom for all marginal distributions, which is only appropriate when each marginal has the same amount of tail heaviness. In this paper, we introduce a new class of extended MST distributions, which allow different degrees of freedom and thereby can accommodate heterogeneity in tail-heaviness across outcomes. The extended MST distributions yield a flexible family of models for multivariate outcomes. The hierarchical representation of the MST distribution allows MCMC methods to be easily applied to compute the parameter estimates. The proposed model is applied to data from two biomedical studies: one on bivariate markers of AIDS progression and the other on sexual behavior from a longitudinal study.

**MSC:**

62-07 Data analysis (statistics) (MSC2010)

62P10 Applications of statistics to biology and medical sciences; meta analysis

62J12 Generalized linear models (logistic models)

62H30 Classification and discrimination; cluster analysis (statistical aspects)

Cited in 1 Document

**Keywords:**

[multivariate skew- \$t\$](#) ; [robust method](#); [scale-mixture representation](#)

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