

# Estimation of the Covariance Matrix in the General Multivariate Mixed Effect Model

by

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## ABSTRACT

The random coefficient and mixed effect models are widely used in repeated measures, panel data, and longitudinal studies. When two or more response variables are measured from each individual at each time point, multivariate models are appropriate. This paper considers a multivariate mixed-effect coefficient model with the random coefficient mean depending on covariates and with certain partially balanced structure. A new algorithm for computing the maximum likelihood estimators of all the parameters is proposed. The new algorithm does not suffer from the usual difficulties associated with the boundary of the parameter space for the random coefficient covariance matrix. In fact, the algorithm can produce a covariance matrix estimate of any rank, and can provide useful information regarding the structure of the random coefficient. Theoretical and numerical results are presented in support of the proposed algorithm.