Clustering multiple longitudinal data via finite mixtures of multivariate t nonlinear mixed model

王婉倫[1]

[1] 逢甲大學 (Feng Chia University)

Abstract

The multivariate t nonlinear mixed-effects model (MtNLMM) has been shown to be effective for analyzing multi-outcome longitudinal data following nonlinear growth patterns with fat-tailed noises or potential outliers. This paper considers the problem of clustering heterogeneous longitudinal profiles in a mixture framework of MtNLMM. A finite mixture of multivariate t nonlinear mixed model is proposed, and this new model allows accommodating complex features of longitudinal data. Intermittent missing values frequently occur in the data collection process of multiple repeated measures. Under a missing at random mechanism, a pseudo-data version of the alternating expectation conditional maximization (AECM) algorithm is developed to carry out maximum likelihood estimation and impute missing values simultaneously. The techniques for clustering of incomplete multiple trajectories, recovery of missing responses, and estimation of random effects are also provided. The utility of the proposed methods is illustrated through a simulation study and a real-data example coming from a pregnant women study.

Keyword: Heterogeneity, Missing data, Mixture models, Multiple nonlinear profiles, Outliers