Diagnostics for repeated measurements in LME models.

Most currently available methods for detecting discordant subjects and observations in linear mixed effects model fits adapt existing methods for single-level regression data. The most common methods are generalizations of deletion-based approaches, primarily Cook's distance. This article describes the limitations of modifications to Cook's distance and local influence, and suggests a new nondeletion subject-level method, studentized residual sum of squares (TRSS) plots. We also suggest a new observation-level deletion method that detects discordant observations as an application of TRSS plots.

TRSS Plots

The proposed method provides greater information on repeated measurements by utilizing revised residuals and efficiently evaluating the effect of discordant subjects and observations on the estimation of parameters including variance components. We compare the performance of the proposed methods with current methods by using the orthodontic growth data: a longitudinal dataset with 27 subjects each observed four times. TRSS plots successfully identified discordant subjects that were missed by modified Cook's distance methods and the local influence approach.

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