

Case-deletion Diagnostics for Linear Mixed Models

Jianxin Pan¹, Yu Fei² and Peter Foster¹

¹ *The University of Manchester, UK*

² *Yunnan University of Finance and Economics, China*

Abstract

Statistical diagnostics for linear mixed models is always challenging because of the complexity of the models when considering detection of outliers and identification of influential subjects/observations [1]. Little work was done in the literature and lots of efforts have to be made for the research topics [2, 3]. Based on the Q-function, the conditional expectation of the logarithm of the joint-likelihood between responses and random effects, we propose a case-deletion approach to identify influential subjects and influential observations in linear mixed models. The models considered here are very broad in the sense that any covariance structures can be specified in the covariance matrices of the random effects and random errors. Analytically explicit forms of diagnostic measures for the fixed effects and variance components are provided. Comparisons with existing methods, including likelihood-based case-deletion and local influence methods, are made. Numerical results, including real data analysis and simulation studies, are presented for both illustration and comparison.

Keywords

Covariance structures, Generalized Cook distance, Influence analysis, Q-function.

References

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