Ikeda, Shu; **Matsuura, Shun**; **Suzuki, Hideo**

Two-step residual-based estimation of error variances for generalized least squares in split-plot experiments. (English) Zbl 1333.62186

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Summary: In split-plot experiments, estimation of unknown parameters by generalized least squares (GLS), as opposed to ordinary least squares (OLS), is required, owing to the existence of whole- and subplot errors. However, estimating the error variances is often necessary for GLS. Restricted maximum likelihood (REML) is an established method for estimating the error variances, and its benefits have been highlighted in many previous studies. This article proposes a new two-step residual-based approach for estimating error variances. Results of numerical simulations indicate that the proposed method performs sufficiently well to be considered as a suitable alternative to REML.

MSC:

62K10 Statistical block designs
62K20 Response surface designs
62J05 Linear regression; mixed models

Keywords:

generalized least squares; response surface methodology; restricted maximum likelihood; split-plot experiment

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