Comparisons of Rank-Based Estimators for The Fixed Effects of a Mixed Model

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Abstract: Several recently proposed rank-based estimators of the fixed effects in a mixed model are discussed. These include the R estimator for the independent error case, where the associated standard errors are corrected for the dependencies in the model. Based on its residuals, robust, practical estimates of the variance components are obtained, which in turn determine in the usual way generalized estimators for the fixed effects. Discussion is based on general score functions and highly efficient estimators, but high breakdown estimators can easily be obtained. A third estimator is based on an iterated reweighted least squares estimator for the general linear and non-linear models. The weights can be chosen to bound the influence in both the response and factor spaces. When the random effect is a grouping (block) factor, R estimators based on separate (group) rankings of residuals are also a possibility. Illustrative examples and small sample investigations of these estimators are presented.

1