Uniformly improvement of inter-block estimators given by Caliński and Kageyama

Andrzej Michalski

Wrocław University of Environmental and Life Sciences, Poland

Abstract

This talk is strictly connected with results obtained by Caliński, Gnot and Michalski (1998) on admissibility of two kinds of estimators of the variance components in model for experiments in block designs. Authors gave sufficient conditions for which the inter-block estimator of the variance of block effects σ_1^2 proposed by Caliński and Kageyama in 1991 is admissible (cf Olsen et al. 1976). It is known that the existence of the uniformly minimum variance unbiased estimators is assured only for special block designs (Baksalary et al. 1990). Generally the estimator $\hat{\sigma}_1^2$ of variance of block effects derived from the submodel, even though one has good properties, is inadmissible in the class of all invariant quadratic unbiased estimators. There is a rich choice of these estimators, each of them beeing admissible with respect to the quadratic loss function and locally best with respect to a prior distribution $\tau(u, v)$ on variance components (σ_1^2, σ^2) (Gnot and Kleffe, 1983). In this article author, first of all, concentrates on the problem of describing subclass of admissible bayesian estimators $\hat{\sigma}_1^2(u, v)$ which uniformly dominate the inter-block estimator $\hat{\sigma}_1^2$. It is shown by numerical examples for several connected and disconnected orthogonal block designs.

Keywords

Admissibillity, Block designs, Variance components, Inter- and intra-block estiamtors, Invariant quadratic unbiased bayesian estimators.

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