# How is retention of BLUEs in linear model under changes of error covariance relevant to Official Statistics, experimental design, and genetics?

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### Abstract

The necessary and sufficient conditions for BLUEs to be retained in a linear model under a change of error covariance go back to [1]. More recent research shows it is also possible to retain the BLUE covariance or the sum of squares of errors. The requirements for retention of BLUEs and BLUE covariance can be extended so that every possible submodel also retains its BLUEs and its BLUE covariance. These properties have applications in Official Statistics, experimental design, and genetics. Examples of these applications will form the focus of the presentation.

## Keywords

Best linear unbiased estimator (BLUE), BLUE covariance matrix, Confidentialised Unit Record File (CURF), data cloning, encryption, genetics, linear model misspecification, Official Statistics, strong singularity, submodels, sum of squares of errors, weak singularity.

## References

[1] Rao, C.R. (1971). Unified theory of linear estimation. *Sankhyā Ser. A*, 33, 371–394. [Corrigenda (1972): 34, p. 194 and p. 477.]