MARVIN H. GRUBER, Rochester Institute of Technology, School of Mathematical Sciences, 85 Lomb Memorial Drive, Rochester, NY 14623

A Matrix Identity and Ridge Type Estimators from Different Points of View

The matrix identity

$$(A + BCD)^{-1} = A^{-1} - A^{-1}B(C^{-1} + DA^{-1}B)^{-1}DA^{-1}$$

enables the study of ridge type estimators for parameters in linear regression models from both the Bayesian and the frequentist point of view.

Ridge regression estimators can be shown to be special cases of mixed and minimax estimators by solving an optimization problem with constraints. They may also be formulated by minimizing the sum of the squares of the regression coefficients on an ellipsoid. These are frequentist arguments.

On the other hand for normal prior distributions and normal errors in the regression model they are special cases of the Bayes estimator.

By an appropriate choice of A, B, C and D in the above identity the estimators obtained by the frequentist and Bayesian argument can be shown to be algebraically equivalent. In this talk I will explain how to do this and give conditions for when this algebraic equivalence is possible.