The MSE of an adaptive ridge estimator in a linear regression model with spherically symmetric error

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Abstract

This paper considers a linear regression model with possible multicollinearity. When the matrix $\mathbf{A}^t\mathbf{A}$ is nearly singular, the least squares estimator (LSE) gets unstable. A typical solution for this problem is the generalized ridge estimator due to Hoerl and Kennard(1970a,b) and its derivatives. Among others, we focus on an adaptive estimator discussed in Wang and Chow(1990) under normality. We assume the error term $\mathbf{e}$ is distributied as a spherically symmetric distributiuon and derive a sufficient condition so that the estimator is superior to the LSE under mean squared error (MSE) and quadratic loss. Several numerical examples are also given.