

Weighted least-squares estimators of parametric functions of the regression coefficients under a general linear model

Yongge Tian

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Abstract The weighted least-squares estimator of parametric functions $\mathbf{K}\boldsymbol{\beta}$ under a general linear regression model $\{\mathbf{y}, \mathbf{X}\boldsymbol{\beta}, \sigma^2\boldsymbol{\Sigma}\}$ is defined to be $\mathbf{K}\hat{\boldsymbol{\beta}}$, where $\hat{\boldsymbol{\beta}}$ is a vector that minimizes $(\mathbf{y} - \mathbf{X}\boldsymbol{\beta})'\mathbf{V}(\mathbf{y} - \mathbf{X}\boldsymbol{\beta})$ for a given nonnegative definite weight matrix \mathbf{V} . In this paper, we study some algebraic and statistical properties of $\mathbf{K}\hat{\boldsymbol{\beta}}$ and the projection matrix associated with the estimator, such as, their ranks, unbiasedness, uniqueness, as well as equalities satisfied by the projection matrices.

Keywords General linear regression model · Parametric functions · WLSE · Projection matrix · Unbiasedness of estimator · Uniqueness of estimator