Linear sufficiency in the partitioned linear model

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Abstract

A linear statistic Fy, where F is an $f \times n$ matrix, is called linearly sufficient for estimable parametric function $K\beta$ under the model $M = \{y, X\beta, V\}$, if there exists a matrix A such that AFy is the BLUE for $K\beta$. In this talk we consider some particular aspects of the linear sufficiency in the partitioned linear model where $X = (X_1 : X_2)$ with β being partitioned accordingly. Our considerations are based on the properties of relevant covariance matrices and their expressions via certain orthogonal projectors. The connection between the transformed model $M_t = \{Fy, FX\beta, FVF'\}$ and the concept of linear sufficiency will have a crucial role. Particular attention will be paid to the situation under which adding new regressors (in X_2) does not affect the linear sufficiency of Fy.

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Keywords

Best linear unbiased estimator, generalized inverse, linear model, linear sufficiency, orthogonal projector, Löwner ordering, transformed linear model.

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