

# Admissibility and linear sufficiency in linear model with nuisance parameters

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**Abstract** In this paper, we derive characterization of admissible and linearly sufficient estimators of a vector of linear estimable functions of parameters in a partitioned linear model. Then, we compare this class of estimators with the class of admissible and linearly sufficient estimators of the same vector of linear parametric functions in a reduced linear model. We show that these classes are equal with probability one.

**Keywords** Admissibility · BLUE · Linear sufficiency · Partitioned linear model · Nuisance parameters · Reduced model

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## 1 Introduction

Consider the general Gauss–Markov model

$$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon}, \quad \text{or shortly } \mathcal{M} = \{\mathbf{y}, \mathbf{X}\boldsymbol{\beta}, \sigma^2\mathbf{V}\}, \quad (1.1)$$

where  $\mathbf{X}$  is a known  $n \times q$  model matrix, the vector  $\mathbf{y}$  is an observable  $n$ -dimensional random vector,  $\boldsymbol{\beta}$  is a  $q \times 1$  vector of unknown parameters and  $\boldsymbol{\varepsilon}$  is an observable vector

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