

# Admissibility and linear sufficiency in linear model with nuisance parameters

Jarkko Isotalo<sup>1</sup>, Augustyn Markiewicz<sup>2</sup>,  
and Simo Puntanen<sup>1</sup>

<sup>1</sup>*University of Tampere, Finland*

<sup>2</sup>*Agricultural University of Poznań, Poland*

## Abstract

In the paper estimation of a vector of linear estimable functions of parameter vector  $\beta$  in linear model with nuisance parameters is considered. We derive characterization of admissible and linearly sufficient estimators of a vector of linear estimable functions of  $\beta$  in a weakly singular model  $\{\mathbf{y}, \mathbf{X}\beta + \mathbf{Z}\gamma, \sigma^2\mathbf{V}\}$ , i.e. in which  $\mathcal{R}(\mathbf{X}) \subseteq \mathcal{R}(\mathbf{V})$ . Moreover, we compare this class of estimators with the class of admissible and linearly sufficient estimators of the same vector of linear parametric functions in reduced linear model  $\{\mathbf{Q}_Z\mathbf{y}, \mathbf{Q}_Z\mathbf{X}\beta, \sigma^2\mathbf{Q}_Z\mathbf{V}\mathbf{Q}_Z\}$ , where  $\mathbf{Q}_Z$  stands for the orthogonal projector onto the orthocomplement of  $\mathcal{R}(\mathbf{Z})$  - the range of  $\mathbf{Z}$ .

## Keywords

Admissibility, Linear sufficiency, Nuisance parameters, Reduced model.