L models and multiple regressions designs

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Abstract

Given an orthogonal model

$$\dot{\mathbf{y}} = \sum_{i=1}^{w} \mathbf{X}_i \boldsymbol{\beta}_i + \dot{\mathbf{e}}$$

an L model

$$\mathbf{y} = \mathbf{L}\left(\sum_{i=1}^{w} \mathbf{X}_i \boldsymbol{\beta}_i + \mathbf{e}\right)$$

is obtained, and the only restriction is the linear independency of the column vectors of matrix $\mathbf{L}$. Special cases of the models correspond to blockwise diagonal matrices $\mathbf{L} = \mathbf{D}(\mathbf{L}_1, ..., \mathbf{L}_{\dot{n}})$.

In multiple regression designs this matrix will be of the form

$$\mathbf{L} = \mathbf{D}(\check{\mathbf{X}}_1, ..., \check{\mathbf{X}}_{\dot{n}})$$

with $\check{\mathbf{X}}_j$, $j = 1, ..., \dot{n}$ the model matrices of the individual regressions, while the original model will have fixed effects. In this way, we overcome the usual restriction of requiring all regressions to have the same model structure.

Keywords

Ortogonal models, L models, Multiple regression designs.

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