

Abstract: Models written as

$$\underline{Y} = \sum_{j=1}^m A_j^t \underline{Y}_j$$

where the $\underline{Y}_1, \underline{Y}_2, \dots, \underline{Y}_m$ are homocedastic with null cross covariance matrices and

$$A^t = [A_1^t A_2^t \dots A_m^t]$$

is orthogonal, are orthogonal combinations (OC) of homocedastic models.

We derive for these models estimators for variance components and estimable vectors. These last ones represent a class of estimators distinct from Least Squares Estimators and having optimal properties.

We apply our results to interesting special cases.