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ABSTRACT:

Multidimensional unreplicated linear functional relationship model (MULFR) with single slope is considered where p-dimensional measurement errors are introduced. When the ratio of error variances is known, the parameters' estimation can be considered as a generalization of the unreplicated linear functional relationship model. However, investigation on unbiased property of the estimators are not strict-forward. Taylor approximation is applied to show the intercept and slope estimators are approximately unbiased. The consistency property is discussed using Fisher Information Matrix. The coefficient of determination for MULFR model and its properties are also studied. A simulation study is carried out to evaluate the proposed estimators of the intercept and slope, and the coefficient of determination. This coefficient of determination provides a useful analysis tool for many image processing applications. A numerical example for JPEG compressed image quality assessment is explained.