

Coefficient of Determination for Multiple Measurement Error Models

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The coefficient of determination (R^2) is used for judging the goodness of fit in a linear regression model. It gives valid results only when the observations are correctly observed without any measurement error. The R^2 provides invalid results in the presence of measurement errors in the data in the sense that sample R^2 becomes an inconsistent estimator of population multiple correlation coefficient between the study variable and explanatory variables. The corresponding variants of R^2 which can be used to judge the goodness of fit in multivariate measurement error model have been proposed in this paper. These variants are based on the utilization of information on known covariance matrix of measurement errors and known reliability matrix associated with explanatory variables. The asymptotic properties of the traditional R^2 and proposed R^2 have been studied analytically and numerically.

Key Words: Measurement error models, coefficient of determination, reliability matrix.