MAXIMUM LIKELIHOOD ESTIMATION IN REGRESSION WITH UNIFORM ERRORS

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The simple linear regression model $y = \alpha + \beta x + \varepsilon$ with i.i.d. uniform errors is considered, and some properties of the maximum likelihood estimators (MLE's) of α and β are derived. In particular, the asymptotic mean square error of the MLE of β when α is known to be zero is proportional to $(\Sigma_1^n |x_i|)^{-2}$ instead of to $(\Sigma_1^n x_i^2)^{-1}$ as it is for the usual least squares estimator (LSE). The MLE's are also superefficient compared with the LSE's when both α and β are unknown.

1. Introduction.

Consider the simple linear regression model with i.i.d. errors

$$(1.1) \qquad y_i = \alpha + \beta x_i + \varepsilon_i, \qquad i=1,2,\ldots,$$

where we are interested in estimating the parameters α and β. The usual LSE's of α and β are MLE's when the ε_i are normal, but not when the normality assumption fails to hold. We shall obtain some properties of MLE's when