

Distribution of estimators in SLR

(STATS310.3: Simple linear regression)

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Marginal distribution of estimator of slope

Recall that

$$E\hat{\beta} = \beta$$

and

$$V[\hat{\beta}] = \frac{\sigma^2}{\sum(x - \bar{x})^2}$$

Under normality, the estimator also has a Gaussian (normal) distribution:

$$\hat{\beta} \sim n\left(\beta, \frac{\sigma^2}{\sum(x - \bar{x})^2}\right)$$

Marginal distribution of estimator of intercept

Exercise: Derive the marginal pdf of $\hat{\alpha}$.