RKMVERI

Mid-Semestral Examination: MSc BDA, Batch 2018-20

Introduction to Econometrics

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All notations are self-explanatory. This question paper carries 55 marks. You can answer any part of any question. However, the maximum that you can score is 50. Marks allotted to each question are given within parentheses.

1. Consider the linear regression model $y_n = \mu+\beta x_n+\varepsilon_n, n=1,2,\ldots\ldots N.$ Assume that $\{\varepsilon_n\}$ *is a sequence of independent random variables with the following distribution* :

   $P(\varepsilon_n=1)=\frac{1}{2}, P(\varepsilon_n=-1)=\frac{1}{2}.$

   a. Check if CLRM conditions hold for $\varepsilon_n.$

   b. Show that OLS estimator of β is consistent. [10+10=20]

2. Consider the linear regression model $y_n = \beta x_n+\varepsilon_n, n=1,2,\ldots\ldots N,$ with $x_n=n^2, \forall\, n=1,\ldots,N.$ Hint $\sum_{i=1}^{n} i^4=\frac{n(n+1)(6n^3+9n^2+n-1)}{30}.$

   a. Check if CLRM assumptions on 'X' hold or not.

   b. Show that OLS estimator of β is consistent. [10+10=20]

3. Consider the linear regression model $y_n = \mu+\varepsilon_n, n=1,2,\ldots\ldots N.$ Assume that $\{\varepsilon_n\}$ *is a sequence of dependent random variables with the following distribution* :

   $P(\varepsilon_n=1)=\frac{1}{2}, P(\varepsilon_n=-1)=\frac{1}{2}, cov(\varepsilon_i,\varepsilon_j)=\rho, \forall\, i\neq j=1,2\ldots N.$

Examine if the least square estimator of μ is consistent or not. Show that OLS estimator of β is consistent. [15]