

科目名稱：統計學【經濟所碩士班】

題號：403003

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 2 頁第 1 頁

Answer the following five questions, equally weighted

請依題序在答案卷上作答 (5 大題, 共 100 分)

1. (20%)

Let X and Y be continuous random variables with joint pdf

$$f_{X,Y}(x,y) = \begin{cases} \left(\frac{1}{8}\right)(6-x-y), & 0 < x < 2, \quad 2 < y < 4 \\ 0, & \text{elsewhere} \end{cases}$$

Find

(a). $f_{Y|x}(y)$, and

(b). $P(2 < Y < 3|x=1)$.

2. (20%)

Let Y_1, Y_2, \dots, Y_n be a random sample from

$$f_Y(y; \theta) = (\theta + 1)y^\theta, \quad 0 < y < 1.$$

Find the method of moment (動差估計) estimators for θ .

3. (20%)

If X_i are independent and $X_i \sim N(\mu, \sigma^2)$. The unbiased estimator for σ^2 is $S^2 = \frac{\sum_i^n (X_i - \bar{X})^2}{n-1}$. Find $Var(S^2)$.

4. (20%)

Consider the following two variables OLS (ordinary least square) regression (under ideal condition) through the origin:

$$Y_i = \hat{\beta}_1 X_{1i} + \hat{\beta}_2 X_{2i} + \hat{u}_i, \quad i = 1, 2, \dots, N.$$

Find $\sum_i^N \hat{u}_i X_{1i}$ and $\sum_i^N \hat{u}_i X_{2i}$ for this model.

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

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5.(20%)

An experiment consists of 5 independent Bernoulli trials. If $H_0 : p = 1/3$ is tested against $H_1 : p > 1/3$ by using the following decision rule:

“Reject H_0 if y , the number of successes, equals or exceeds 2”.

Find

(a). α , and

(b). β , if $p = 1/2$.