

系所別: 產業經濟研究所 甲組 科目:

統計學

1. A random variable X follows the exponential distribution if it has the following probability density function:

$$f(x) = \begin{cases} (\frac{1}{\theta}) e^{-x/\theta} & \text{for } x > 0 \\ 0 & \text{elsewhere} \end{cases}$$

where $\theta > 0$ is the parameter of the distribution. Using the maximum likelihood method to find the estimator of θ .

2. Given the following model

$$y_t = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \dots + \beta_k x_{tk} + \varepsilon_t$$

where $\varepsilon_t \sim N(0, \sigma^2)$. Under the null hypothesis that $\beta_2 = \beta_3 = \dots = \beta_k = 0$, how do you perform the test?

3. Define $h(t)$ for $|t| \leq 1$ by $h(t) = 1/(2-t)$

- (a). Show that $h(t)$ is the factorial moment generating function for some r.v. X .
- (b). Find the n -th factorial moment of X .
- (c). Find EX^3 .
- (d). Find the factorial moment generating function for $Y = 3X + 2$.

