

大葉大學 九十二 學年度 研究所碩士班 招生考試試題紙

系 所 別	組 別	考 試 科 目 (中文名稱)	考 試 日 期	節 次	備 註
工業工程所	甲組	機率與統計	4月13日	第 1 節 08:30 ~ 10:00	可攜帶計 算機 共 2 頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

1. Let X denote the repair time in days required for a certain component in an airplane. We wish to test whether a Poisson model with a mean of 3 days appears to be a reasonable model for this variable. The repair times for 40 components were recorded in the following table. In some cases the component could be repaired immediately on site, which is interpreted as 0 days.

(a) Given the type I error $\alpha=0.1$, set up the hypothesis testing. (10 分)

(b) Use Chi-squared goodness-of-fit test to evaluate the hypothesis testing (Hint: 1. one can reject the null hypothesis H_0

if $\chi^2 = \sum_{j=1}^c (o_j - e_j)^2 / e_j > \chi^2_{1-\alpha}(c-1)$. 2. as a general principal, $e_j \geq 5$. 3. $\chi^2_{0.9}(4) = 7.78$). Fill out the blank in

the table will help you answer the question. Do not forget to pool the cell to achieve an $e_j \geq 5$. Note that the Poisson

distribution with λ mean gives $f(x) = e^{-\lambda} \lambda^x / x!$. (40 分)

Repair time (days)	0	1	2	3	4	5	6	7
Observed (o_j)	1	3	7	6	10	7	6	0
Probabilities (p_{jo})								
Expected (e_j)								

2. 何謂不偏點估計(Unbiased point estimate)? (10 分) 假設 X_1, X_2, \dots, X_n 是一個機率分布的樣本觀察值，該分布的平

均值為 μ ，變異數為 σ^2 。請證明該樣本的平均值 $\bar{X} = \frac{\sum_{i=1}^n X_i}{n}$ 和樣本的變異數 $S^2 = \frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n-1}$ 是各別為母群體平均值 μ

和變異數 σ^2 的不偏點估計。(40 分)