

長庚大學期中、期末考試答案用紙

科目 機率

學年度 第 學期

考

資工

系

姓名 呂重毅

學號 80729027

1. (a) 常態型分布

$$(a) \quad Z = \frac{X - \mu}{\sigma}, \quad f_Z(X) = e^{-\frac{1}{2}Z^2} \\ E(Z_0 + Z_1) = 0, \quad E(Z_0 + Z_1)^2 = 1 + 1 = 2$$

(b) 卡方分布

$$(b) \quad P(Q_1) = Z^2 \sim \chi^2 \text{ (df=1)}$$

(c) 卡方分布

$$(c) \quad P(Q_2) = Z_1^2 + Z_2^2 \sim \chi^2 \text{ (df=2)}$$

(d) 柯西分布

(e) 二項式分布

(f) 二項式分布

$$2. \quad (a) \quad P(Z_0 + Z_1 \leq 1) = 0.6914, \quad (1 - \text{st. norm. sf}(1, 0, 2))$$

$$(b) \quad P(Z_0^2 \leq 1) = 0.8413, \quad (1 - \text{st. norm. sf}(1, 0, 1))$$

$$(c) \quad P(Z_1^2 + Z_2^2 \leq 1) = 0.6914, \quad (1 - \text{st. norm. sf}(1, 0, 2))$$

$$(d) \quad P\left(\frac{Z_1}{Z_2} \leq 1\right) = \frac{0.9142}{0.2258}$$

$$3. \quad (a) \quad \mu_A = 65, \quad \frac{\sigma_A^2}{n} = \frac{3^2}{25} = \frac{9}{25}$$

$$Z = \frac{\bar{X}_A - 65}{\frac{3}{5}}$$

$$P(\bar{X}_A \leq 64) = P\left(\frac{\bar{X}_A - 65}{\frac{3}{5}} \leq \frac{64 - 65}{\frac{3}{5}}\right) = P(Z \leq -1.67) \approx 0.04746 = 4.7\%$$

(b)

$$P(\bar{X}_B - \bar{X}_A > 5.5 | \mu_B = \mu_A)$$

$$= P\left(Z > \frac{5.5 - 0}{\sqrt{\frac{3^2}{30} + \frac{3^2}{30}}}\right) = P\left(Z > \frac{5.5 \times \sqrt{2}}{\sqrt{30}}\right) = P(Z > 4.26) \approx 0$$

$$\sigma_{\bar{X}_B - \bar{X}_A} = \sqrt{\frac{3^2}{30} + \frac{3^2}{30}} = \sqrt{\frac{6}{30}} = \sqrt{\frac{1}{5}} = 1.291$$

(請翻面繼續作答)

# 長庚大學期中、期末考試答案用紙

科目 \_\_\_\_\_

學年度 第 \_\_\_\_\_ 學期 \_\_\_\_\_ 考 \_\_\_\_\_ 系 姓名 \_\_\_\_\_ 學號 \_\_\_\_\_

(C).

$$\text{variance} = \frac{25}{5}$$

$$\bar{x} - \bar{x} = \frac{25}{30} - \frac{25}{30} = 0$$

$$\frac{1}{5} \left( \frac{1}{5} \right)^2 = \frac{1}{5} \cdot \frac{1}{25} = \frac{1}{125} = 0.008$$

$$= \frac{1}{5} \cdot \frac{30}{50} = 1.$$