

$$\textcircled{20} \quad (1) \bar{x} = 7.67 \quad \bar{y} = 6.98, \quad s_x^2 = 9.27, \quad s_y^2 = 21.15$$

$$V = \frac{\left(\frac{9.27}{9} + \frac{21.15}{9}\right)^2}{\frac{(9.27)^2}{8} + \frac{(21.15)^2}{8}} = 10.96 \div 11$$

$$(0.89 - 2.201 \times 7.7, 0.89 + 2.201 \times 7.7) = (-16.06, 17.84) \#$$

$$(2) 1 - \alpha = 0.9, \quad X_{\frac{n}{2}}^2(n, -1) = X_{0.05}^2(8) = 15.51$$

$$X_{1-\frac{\alpha}{2}}^2(n, -1) = X_{0.95}^2(8) = 2.73$$

$$\left(\sqrt{\frac{8 \times 9.27^2}{X_{0.05}^2(8)}}, \sqrt{\frac{8 \times 9.27^2}{X_{0.95}^2(8)}} \right) = (6.66, 15.87) \#$$

$$(3) 1 - \alpha = 0.9, \quad F_{\frac{\alpha}{2}}(n_1 - 1, n_2 - 1) = F_{0.05}(8, 8) = 3.44$$

$$F_{0.95}(8, 8) = \frac{1}{F_{0.05}(8, 8)} \div 0.29$$

$$\left(\frac{9.27^2}{21.15^2} \times \frac{1}{3.44}, \frac{9.27^2}{21.15^2} \times \frac{1}{0.29} \right) = (0.06, 0.66) \#$$

(31) $n=9$ 每件 6 之 90% T6 領區 P9 為 $(6.66, 15.87)$

$$(1) 1 - \alpha = 0.9, \quad X_{0.05}^2(8) = 15.51, \quad X_{0.95}^2(8) = 2.73$$

$$\sqrt{\frac{(n-1)s^2}{15.51}} = 6.66, \quad s = 9.27 \#$$

$$(2) \left(\frac{(n-1)s^2}{X_{0.025}^2(8)}, \frac{(n-1)s^2}{X_{0.975}^2(8)} \right) = \left(\frac{(n-1)9.27^2}{17.53}, \frac{(n-1)9.27^2}{2.18} \right) \\ = \left(\frac{687.4632}{17.53}, \frac{687.4632}{2.18} \right) \\ = (39.22, 315.35) \#$$

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Week 5

① (1) 母体是常態分配，母体標準差之點估計值為 $s = \sqrt{\frac{\sum x_i^2 - n\bar{x}^2}{n-1}}$

$$\sqrt{\frac{1284 - 6 \times 10.38^2}{5}} = \sqrt{10.38} = 3.22$$

$$(2) 1 - \alpha = 0.9 \quad \frac{\alpha}{2} = 0.05 \quad n-1=5 \quad \chi_{0.05}^2(5) = 11.07$$

$$\left(\sqrt{\frac{5 \times 10.38}{\chi_{0.05}^2(5)}}, \sqrt{\frac{5 \times 10.38}{\chi_{0.95}^2(5)}} \right) = \left(\sqrt{\frac{51.9}{11.07}}, \sqrt{\frac{51.9}{1.15}} \right) = (2.17, 6.72)$$

② (1) 母体是常態分配，母体平均取樣之點估計值為

$$\bar{x} = (3.5 + 2.4 + 3.2 + 2.5 + 4.8 + 5.5 + 3.4 + 4.5 + 4.3 + 5.8) / 10 = 3.99$$

$$(2) 1 - \alpha = 0.95, \frac{\alpha}{2} = 0.025 \quad n-1=9 \quad s^2 = \frac{171.73 - 15.92 \times 10}{9} = 1.39$$

☆ 小樣本， σ 未知 \rightarrow t 分配

$$t_{\frac{\alpha}{2}(n-1)} = t_{0.025(9)} = 2.262$$

$$(3.99 - 2.262 \frac{1.18}{\sqrt{10}}, 3.99 + 2.262 \frac{1.18}{\sqrt{10}}) = (3.15, 4.83)$$

$$(3) 1 - \alpha = 0.95, \frac{\alpha}{2} = 0.025 \quad \chi_{\frac{\alpha}{2}(n-1)}^2 = \chi_{0.025(9)}^2 = 19.02$$

$$\Rightarrow \chi_{0.95}^2(9) = 2.7$$

$$\textcircled{1} \left(\frac{9 \times 1.39}{19.02}, \frac{9 \times 1.39}{2.7} \right) = (0.66, 4.63)$$

$$\textcircled{2} \left(\sqrt{\frac{9 \times 1.39}{19.02}}, \sqrt{\frac{9 \times 1.39}{2.7}} \right) = (0.81, 2.15)$$