DATE

9. 母体是常态分配，母体标准差 σ 之点估计为：

(1) $S=\sqrt{\frac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1}}=\sqrt{\frac{\sum x_i^2-n\bar{x}^2}{n-1}}$

$=\sqrt{\frac{1284-6\times14.33^2}{5}}=\sqrt{10.38}=3.22$

σ 之点估计为 3.22

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

$\chi^2_{\frac{\alpha}{2}}(n-1)=\chi^2_{0.05}(5)=11.07$

$\chi^2_{1-\frac{\alpha}{2}}(n-1)=\chi^2_{0.95}(5)=1.15$

σ 之 90% 信赖区间为

$$\left(\sqrt{\frac{5\times10.38}{\chi^2_{0.05}(5)}},\sqrt{\frac{5\times10.38}{\chi^2_{0.95}(5)}}\right)=\left(\sqrt{\frac{51.9}{11.07}},\sqrt{\frac{51.9}{1.15}}\right)=(2.17,6.72)$$

20.(1) $\because \sigma_1^2 \neq \sigma_2^2$

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

$\mu_1-\mu_2$ 之95%信赖区间为

$$(\bar{x}-\bar{y})\pm t_{\frac{\alpha}{2}}(v)\sqrt{\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}}=(7.67-6.78)\pm t_{0.025}(11)\sqrt{\frac{9.27^2}{9}+\frac{21.15^2}{9}}$$

$$=0.89\pm 2.201\times 7.7$$

$$=0.89\pm 16.95$$

即 $(-16.06, 17.84)$

(2) $1-\alpha=0.9$ $\quad \chi^2_{\frac{\alpha}{2}}(n_1-1)=\chi^2_{0.05}(8)=15.51$

$\chi^2_{1-\frac{\alpha}{2}}(n_1-1)=\chi^2_{0.95}(8)=2.73.$

σ_1^2 之90%信赖区间为.

$$\left(\sqrt{\frac{8\times 9.27^2}{\chi^2_{0.05}(8)}},\sqrt{\frac{8\times 9.27^2}{\chi^2_{0.95}(8)}}\right)=\left(\sqrt{\frac{687.46}{15.51}},\sqrt{\frac{687.46}{2.73}}\right)$$

$$=(6.66, 15.87)$$

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

$$F_{1-\frac{\alpha}{2}}(n_1-1, n_2-1)=F_{0.95}(8,8)=\frac{1}{F_{0.05}(8,8)}=0.29$$

$\frac{\sigma_1^2}{\sigma_2^2}$ 之90%信赖区间为

$$\left(\frac{S_1^2}{S_2^2}\times\frac{1}{F_{\frac{\alpha}{2}}(n_1-1,n_2-1)},\frac{S_1^2}{S_2^2}\times\frac{1}{F_{1-\frac{\alpha}{2}}(n_1-1,n_2-1)}\right)=\left(\frac{9.27^2}{21.15^2}\times\frac{1}{3.44},\frac{9.27^2}{21.15^2}\times\frac{1}{0.29}\right)$$

$$=(0.06, 0.66)$$