例 6.7

$\bar{x}=16.33$, $s=4.29$

① $1-\alpha=0.95$, $\alpha=0.05$

$z_{\frac{\alpha}{2}}=z_{0.025}=1.96$

95%百分信賴區間 $\bar{x}\pm z_{\frac{\alpha}{2}}\frac{s}{\sqrt{n}}$

$=16.33\pm 1.96\frac{4.29}{\sqrt{36}}$

$=16.33\pm 1.4014$

$\Rightarrow (14.93, 17.73)$ #

② $1-\alpha=0.90$, $\alpha=0.10$

$z_{\frac{\alpha}{2}}=z_{0.05}=1.645$

90%百分信賴區間 $\bar{x}\pm z_{\frac{\alpha}{2}}\frac{s}{\sqrt{n}}$

$=16.33\pm 1.645\frac{4.29}{\sqrt{36}}$

$=16.33\pm 1.18$

$\Rightarrow (15.15, 17.51)$ #

例 6.9

① $n=12$, $\bar{x}=(15000+15100+15000+15200+15500+15400+15600+15500+15300+15200+15300+15400)/12=15291.67$ #

$s=\sqrt{\Sigma(x_i-\bar{x})^2/(n-1)}=197.52$

② $1-\alpha=0.90$, $\alpha=0.10$, 自由度 $n-1=12-1=11$

$z_{\frac{\alpha}{2}}=z_{0.05}=1.645$

$t_{0.05}(11)=1.796$ 90%百分信賴區間 $\bar{x}\pm t_{\frac{\alpha}{2}}(n-1)\frac{s}{\sqrt{n}}$

$=15291.67\pm 1.796\frac{197.52}{\sqrt{12}}$

$=15291.67\pm 102.41$

$\Rightarrow (15189.26, 15394.08)$ #

③ μ 的 90% 區間長度

$2t_{\frac{\alpha}{2}}(n-1)\frac{s}{\sqrt{n}}=2\times t_{0.05}(11)\frac{197.52}{\sqrt{12}}$

$=2\times 1.796\times\frac{197.52}{\sqrt{12}}=2\times 102.41=204.82$ #

例 6.19

$1-\alpha=0.95$, $\alpha=0.05$, $e=0.01$, $s=0.05$

$z_{\frac{\alpha}{2}}=z_{0.025}=1.96$

$n=\left(\frac{z_{\frac{\alpha}{2}}s}{e}\right)^2=\left(\frac{1.96\times 0.05}{0.01}\right)^2=96.04$

取 $n=97$, $97-35=62$ #