

3.6.1 大样本情形

[2] 例题1. $n=500$, $P=\frac{15}{500}=0.03$ $\therefore np \div nP=15 \geq 5$, $nq=500-15=485 \geq 5$
求母比率 p 的 95% 信赖区间.

$$P - \sqrt{\frac{P(1-P)}{n}} \cdot z(0.025) < p < P + \sqrt{\frac{P(1-P)}{n}} \cdot z(0.025)$$

$$\therefore z(0.025) = 1.96$$

$$0.03 - \sqrt{\frac{0.03 \times 0.97}{500}} \times 1.96 < p < 0.03 + \sqrt{\frac{0.03 \times 0.97}{500}} \times 1.96$$

$$\therefore 0.015 < p < 0.045$$

[3] 例题2. $n=50$, $P=\frac{20}{50}=0.4$ $\therefore np \div nP=20 \geq 5$, $nq=50-20=30 \geq 5$.
求母比率 p 的 99% 信赖区间.

$$P - \sqrt{\frac{P(1-P)}{n}} \cdot z(0.005) < p < P + \sqrt{\frac{P(1-P)}{n}} \cdot z(0.005)$$

$$\therefore z(0.005) = 2.5758$$

$$0.4 - \sqrt{\frac{0.4 \times 0.6}{50}} \times 2.5758 < p < 0.4 + \sqrt{\frac{0.4 \times 0.6}{50}} \times 2.5758$$

$\underbrace{\hspace{10em}}_{0.178}$

$$\therefore 0.222 < p < 0.578 \quad \therefore 0.22 < p < 0.58$$

[4] 例题3. 母比率 p 的 95% 信赖区间.

$$P - \sqrt{\frac{P(1-P)}{n}} \cdot z(0.025) < p < P + \sqrt{\frac{P(1-P)}{n}} \cdot z(0.025)$$

$$\therefore 2z(0.025) \cdot \sqrt{\frac{P(1-P)}{n}} \leq 0.04 \quad \therefore n \geq P(1-P) \left\{ \frac{2 \cdot z(0.025)}{0.04} \right\}^2$$

$$\therefore P=0.4, z(0.025)=1.96$$

$$\therefore n \geq 0.4 \times 0.6 \times \left\{ \frac{2 \times 1.96}{0.04} \right\}^2 = 2304.96 \quad \therefore n \geq 2305$$