

E6.2  $P_x$ : success rate

$$\hat{p}_1 = \frac{14}{18} \quad \hat{p}_2 = \frac{22}{30}$$

$$H_0: p_1 - p_2 \leq (p_1 - p_2)_0 = 0$$

use a pooled large-sample test for equality of proportions

$$\hat{p} = \frac{n_1 \hat{p}_1 + n_2 \hat{p}_2}{n_1 + n_2} = \frac{14 + 22}{18 + 30} = \frac{3}{4}$$

$$Z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{78\% - 73\%}{\sqrt{\frac{3}{4} \times \frac{1}{4} \times \left(\frac{1}{18} + \frac{1}{30}\right)}} = 0.387$$

We do not reject  $H_0$ . Hence no evidence can be shown.

ii)  $\alpha = 5\%$

$$\hat{p}_1 - \hat{p}_2 \pm Z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

代入数值

$$78\% - 73\% \pm 1.64 \times \sqrt{\frac{78\% \times 22\%}{18} + \frac{73\% \times 27\%}{30}}$$

即

$$0.05 \pm 0.21$$