

例 9.10 1107270024 吳啟利

企管 = 甲

$$H_0: \mu_1 = \mu_2 = \mu_3, n = 5 + 6 + 6 = 17$$

$$SST = \sum_{i=1}^k \sum_{j=1}^{n_i} y_{ij}^2 - \frac{T^2}{n}$$

$$= 39.159 - 33.264 = 5.895$$

$$SSTR = \sum_{i=1}^k \left( \frac{T_i^2}{n_i} \right) - \frac{T^2}{n}$$

$$= 37.873 - 33.264 = 4.609$$

$$SSE = SST - SSTR = 1.286$$

聯合信賴區間計算

$$m = \binom{3}{2} = 3, \frac{\alpha}{m} = \frac{0.05}{3} = 0.0167$$

$$t_{\frac{\alpha}{m}}(14) = t_{0.0167}(14) = 2.718$$

$$S = \sqrt{MSE} = \sqrt{0.072} = 0.303$$

95% 信賴區間

$$\mu_2 - \mu_1 = (1.53 - 0.63) \pm 2.718 \times 0.303 \times \sqrt{\frac{1}{5} + \frac{1}{5}} = (0.401, 1.399), \text{ 不包含 } 0$$

$$\mu_3 - \mu_2 = (1.91 - 1.53) \pm 2.718 \times 0.303 \times \sqrt{\frac{1}{6} + \frac{1}{6}} = (-0.095, 0.855), \text{ 包含 } 0$$

$$\mu_3 - \mu_1 = (1.91 - 0.63) \pm 2.718 \times 0.303 \times \sqrt{\frac{1}{6} + \frac{1}{5}} = (0.721, 1.779), \text{ 不包含 } 0$$

變異來源 | 平方和 | 自由度 | 均方 | F 檢定值

減肥藥 |  $SSTR = 4.609$  |  $3-1=2$  |  $MSTR = 2.305$  |  $\frac{2.305}{0.072} = 25.05$

隨機誤差 |  $SSE = 1.286$  |  $17-3=14$  |  $MSE = 0.092$

總和 |  $SST = 5.895$  |  $17-1=16$

結論:

減肥藥 2 與 3 無顯著差異,

但方法 1, 2 與 1, 3 有...

$$F = 25.05 > F_{0.05}(2, 14) = 3.74$$

棄卻  $H_0$ , 認為三種減肥藥有明顯差異

例 9.12 1107270024 吳啟利

$$m = \binom{3}{2} = 3, F_{0.05}(3-1, 17-3) = 3.74$$

$$S = \sqrt{MSE} = \sqrt{0.092} = 0.303$$

$$\sqrt{(k-1)F} = \sqrt{(3-1) \times 3.74} = 2.73$$

95% 信賴區間:

$$\mu_2 - \mu_1 = (1.53 - 0.63) \pm 2.73 \times 0.303 \times \sqrt{\frac{1}{5} + \frac{1}{5}} = (0.399, 1.401), \text{ 不包含 } 0$$

$$\mu_3 - \mu_2 = (1.91 - 1.53) \pm 2.73 \times 0.303 \times \sqrt{\frac{1}{6} + \frac{1}{6}} = (-0.078, 0.856), \text{ 包含 } 0$$

$$\mu_3 - \mu_1 = (1.91 - 0.63) \pm 2.73 \times 0.303 \times \sqrt{\frac{1}{6} + \frac{1}{5}} = (0.719, 1.781), \text{ 不包含 } 0$$

只有減肥藥 2 與 3 間無明顯差異, 此算法信賴區間較寬