Sumikko gurashi

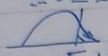
NO. DATE

例11.3、 $H_0 = \mu_1 = \mu_2 = \mu_3 = \mu_4$

$H_1 = H_0$不成立 $\Rightarrow$ (μ_i不全等) σ_i^2不全等

$\Rightarrow$ 才由卡素分西己

給定顯頁著水準 $\alpha = 0.01$



拒絕土或: $F > F_{3,18,0.01} = 5.09$

$\because 8.99 > 5.09$

$\therefore$ 拒絕 H_0，四組成績有顯頁著差異，四種教學方法有顯頁著不同效果。

計算平方和:

$\bar{y}_1 = \frac{149}{4} = 87.25$

$\bar{y}_2 = \frac{197}{7} = 78.2$

$\bar{y}_3 = \frac{511}{7} = 72.86$

$\bar{y}_4 = \frac{414}{6} = 69$

$SST_O = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (y_{ij} - \bar{\bar{y}})^2$

$= (85 - 75.64)^2 + (94 - 75.64)^2 + \cdots + (65 - 75.64)^2 = 1485.09$

$SSB = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (\bar{y}_i - \bar{\bar{y}})^2 = 4(87.25 - 75.64)^2 + 7(78.2 - 75.64)^2 + 7(72.86 - 75.64)^2 + 6(69 - 75.64)^2 = 890.68$

$SSW = SST_O - SSB = 1485.09 - 890.68 = 594.41$

例11.5、 第1組 $n_1 = 3$、$\bar{y}_1 = 12$、$s_1^2 = 25$

第2組 $n_2 = 5$、$\bar{y}_2 = 14$、$s_2^2 = 16$

第3組 $n_3 = 7$、$\bar{y}_3 = 15$、$s_3^2 = 9$

$H_0: \mu_1 = \mu_2 = \mu_3$

$H_1: \mu_i$不全等

顯頁著水準 $\alpha = 0.05$

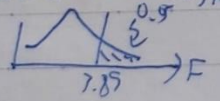
$\bar{\bar{y}} = \frac{\sum n_i \bar{y}_i}{\sum n_i} = \frac{3 \times 12 + 5 \times 14 + 7 \times 15}{3+5+7} = 14.27$

$SSB = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (\bar{y}_i - \bar{\bar{y}})^2 = \sum_{i=1}^{k} n_i (\bar{y}_i - \bar{\bar{y}})^2 = 3(12 - 14.27)^2 + 5(14 - 14.27)^2 + 7(15 - 14.27)^2 = 8.93$

$SSW = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (y_{ij} - \bar{y}_i)^2 = \sum_{i=1}^{k} (n_i - 1) s_i^2 = (3-1)25 + (5-1)16 + (7-1)9 = 168$

$SST_O = SSB + SSW = 8.93 + 168 = 176.93$

拒絕土或: $F > F_{2,12,0.05} = 3.89$



$\because 0.32 < 3.89$，不拒絕 H_0，三個母骨豐平均數可能相等。

例9.7 A 120 180　　$T_1=120+180=300$，$T=300+390+570+540$
$=1800$

B 140 120 130　　$T_2=390$

C 190 170 210　　$T_3=570$　　$T=\sum_{i=1}^{4}\sum_{j=1}^{n_i} y_{ij}^2=354400$

D 240 300　　$T_4=540$

$SST=354400-\frac{324000^2}{10}=30400$

$SSTR=\sum_{i=1}^{k}\left(\frac{T_i^2}{n_i}\right)-\frac{T^2}{n}=\frac{300^2}{2}+\frac{390^2}{3}+\frac{570^2}{3}+\frac{540^2}{2}-\frac{1800^2}{10}=25800$

$SSE=SST-SSTR=4600$

例9.8 $H_0: \alpha_1=\alpha_2=\alpha_3=\alpha_4$

H_1：顯著影響不相同

平方和	自由度		F
$SSTR=25800$	$4-1=3$	$MSTR=\frac{25800}{3}=8600$	$\frac{8600}{767}$
$SSE=4600$	$10-4=6$	$MSE=\frac{4600}{6}=767$	$=11.2$
$SST=30400$	$10-1=9$		

$F=11.2>F_{0.05}(3,6)=4.76$，拒絕$H_0$、顯著影響不相同