



实验33 单因素方差分析程序

下列程序可以作单因素等水平方差分析问题:

```
ANOVA(X, α) := (r ← cols(X) t ← rows(X))
for k ∈ 0..r-1
  meansk ← mean(X<k>)
Mgrand ← mean(means)
SA ← t · ∑j=0r-1 (meansj - Mgrand)2
SE ← ∑i=0t-1 ∑j=0r-1 (Xi,j - meansj)2
ST ← SA + SE
F ←  $\frac{\frac{SA}{r-1}}{\frac{SE}{t(r-1)}}$  qα ← qF[1 - α, r-1, r · (t-1)]
if F > qα
  Conc ← "Reject Ho"
  sig ← "Significant"
otherwise
  Conc ← "Accept Ho"
  sig ← "No significant"
 $\begin{bmatrix} SA & r-1 & \frac{SA}{r-1} & F \\ SE & r \cdot (t-1) & \frac{SE}{r \cdot (t-1)} & q\alpha \\ ST & r \cdot t - 1 & sig & Conc \end{bmatrix}$ 
```

$$X := \begin{pmatrix} 278.5 & 245.2 & 249.2 & 273.0 \\ 276.4 & 249.5 & 245.2 & 250.9 \\ 271.0 & 236.8 & 252.8 & 258.4 \\ 272.4 & 239.0 & 251.4 & 266.5 \end{pmatrix}$$

给出原始数据矩阵

调用上述程序：

$$\text{ANOVA}(X, 0.05) = \begin{pmatrix} 2385.232 & 3 & 795.077 & 21.322 \\ 447.465 & 12 & 37.289 & 3.49 \\ 2832.697 & 15 & \text{"Significant"} & \text{"Reject Ho"} \end{pmatrix}$$

$$M := \begin{pmatrix} 0.236 & 0.257 & 0.258 \\ 0.238 & 0.253 & 0.264 \\ 0.248 & 0.255 & 0.259 \\ 0.245 & 0.254 & 0.267 \\ 0.243 & 0.261 & 0.262 \end{pmatrix} \quad \text{cols}(M) = 3 \quad \text{rows}(M) = 5 \quad \text{原始数据矩阵}$$

$$\text{ANOVA}(M, 0.05) = \begin{pmatrix} 0.00105333 & 2 & 0.00052667 & 27.43055556 \\ 0.000192 & 12 & 0.000016 & 3.88529383 \\ 0.00124533 & 14 & \text{"Significant"} & \text{"Reject Ho"} \end{pmatrix}$$

$$X := \begin{pmatrix} 278.5 & 245.2 & 249.2 & 273.0 \\ 276.4 & 249.5 & 245.2 & 240.9 \\ 271.0 & 236.8 & 252.8 & 258.4 \\ 272.4 & 239.0 & 251.4 & 266.5 \\ 275.8 & 244.7 & 250.5 & 252.3 \end{pmatrix} \quad \text{原始数据矩阵}$$

$$\text{ANOVA}(X, 0.05) = \begin{pmatrix} 2821.862 & 3 & 940.621 & 17.692 \\ 797.496 & 16 & 49.843 & 3.239 \\ 3619.358 & 19 & \text{"Significant"} & \text{"Reject Ho"} \end{pmatrix}$$