Parcial 2

Monday, April 11, 2022 11:17 PM

ANOVA comparación de medias

1.

$$\begin{bmatrix} 15 & 14 & 13 \\ 16 & 13 & 12 \\ 14 & 15 & 11 \\ 15 & 16 & 14 \\ 17 & 14 & 11 \end{bmatrix}$$

$\bar{x}_1 = 15.4$
$\bar{x}_2 = 14.4$
$\bar{x}_3 = 12.2$

$\bar{x} = 14.$

$$\bar{x}_L - \bar{x} = \begin{bmatrix} 1.4 & 0.4 & -1.8 \\ 1.4 & 0.4 & -1.8 \\ 1.4 & 0.4 & -1.8 \\ 1.4 & 0.4 & -1.8 \\ 1.4 & 0.4 & -1.8 \end{bmatrix}$$

$$x_{lj} - \bar{x}_l = \begin{bmatrix} -0.4 & -0.4 & 0.8 \\ 0.6 & -1.4 & -0.2 \\ -1.4 & 0.6 & -1.2 \\ -0.4 & 1.6 & 1.8 \\ 1.6 & -0.4 & -1.2 \end{bmatrix}$$

$SS_{treat} = 5(1.4^2) + 5(0.4^2) + 5(1.8^2) = 26.8$

$SS_{res} = 4(0.4^2) + 2(0.6^2) + 2(1.4^2) + 2(1.6^2) + 0.8^2 + 0.2^2 + 2(1.2^2) + 1.8^2 = 17.2$

$$F = \frac{26.8/2}{17.2/2} = 1.56$$

$f_{g-1,n-g}(\alpha) = f_{2,2}(0.05) = 19.$

Como $1.56 < 19$, no rechazo q' serán iguales las medias.

2. Y

Gasto	Ingreso	Tamaño flia
0.43	2.1	3
0.51	1.1	4

a. Y → Gastos.

$$\begin{bmatrix} 0.32 & 1.8 & 6 \\ 0.29 & 1 & 5 \\ 0.35 & 2.4 & 2 \\ & (1.68) & (4) \end{bmatrix} \qquad Z = \begin{bmatrix} 1 & 2.1 & 3 \\ 1 & 1.1 & 4 \\ 1 & 1.8 & 6 \\ 1 & 1 & 5 \\ 1 & 2.4 & 2 \end{bmatrix}$$

$n = 5 \quad r = 2$

$q = 3$

$$\beta = (Z'Z)^{-1} Z' Y.$$

$$\left(\begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 2.1 & 1.1 & 1.8 & 1 & 2.4 \\ 3 & 4 & 6 & 5 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2.1 & 3 \\ 1 & 1.1 & 4 \\ 1 & 1.8 & 6 \\ 1 & 1 & 5 \\ 1 & 2.4 & 2 \end{bmatrix} \right)^{-1} = \begin{bmatrix} 5 & 8.4 & 20 \\ 8.4 & 15.6 & 31.3 \\ 20 & 31.3 & 90 \end{bmatrix}^{-1}$$

$$\det = 5(424.31) - 8.4(130) + 20(-49.1)$$
$$= 47.95$$

$$\text{Cof}^{1} = \begin{bmatrix} 424.31 & -130 & -49.1 \\ -130 & 50 & 11.5 \\ -49.1 & 11.5 & 7.44 \end{bmatrix}$$

$$\hat{\beta} = \frac{1}{47.95} \begin{bmatrix} 424.31 & -130 & -49.1 \\ -130 & 50 & 11.5 \\ -49.1 & 11.5 & 7.44 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 2.1 & 1.1 & 1.8 & 1 & 2.4 \\ 3 & 4 & 6 & 5 & 2 \end{bmatrix}$$

3×3 $\qquad$ 3×5

$$= \frac{1}{47.95} \begin{bmatrix} 424.31 & -130 & -49.1 \\ -130 & 50 & 11.5 \\ -49.1 & 11.5 & 7.44 \end{bmatrix} \begin{bmatrix} 1.9 \\ 3.2 \\ 7.4 \end{bmatrix}$$

$$\hat{\beta} = \frac{1}{47.95} \begin{bmatrix} 26.85 \\ -1.9 \\ -1.4 \end{bmatrix}$$

$$\hat{Y} = Z\hat{\beta}$$
$$= Z \frac{1}{47.95} \begin{bmatrix} 26.85 \\ -1.9 \\ -1.4 \end{bmatrix}$$

(3.) $\sum_{n} var = \sum_{n} \lambda_i$

$$\Sigma = P \Lambda P' = \begin{bmatrix} e_1 & \cdots & e_p \end{bmatrix} \begin{bmatrix} \lambda_1 & \cdots & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & \lambda_p \end{bmatrix} \begin{bmatrix} e_1 \\ \vdots \\ e_p \end{bmatrix}$$

$$\begin{bmatrix} s_{11} & \cdots & s_{1p} \\ \vdots & \ddots & \vdots \\ s_{p1} & \cdots & s_{pp} \end{bmatrix} = \begin{bmatrix} e_1 \lambda_1 & 0 & \cdots & 0 \\ 0 & \ddots & & \vdots \\ \vdots & & \ddots & 0 \\ 0 & \cdots & 0 & e_p \lambda_p \end{bmatrix} \begin{bmatrix} e_1 \\ \vdots \\ e_p \end{bmatrix}$$

$$\begin{bmatrix} varx_1 & & \\ & \ddots & \\ & & varx_p \end{bmatrix} = \begin{bmatrix} e_1 \lambda_1 e_1 & 0 & \cdots & 0 \\ 0 & \ddots & & \vdots \\ \vdots & & \ddots & 0 \\ 0 & \cdots & 0 & e_p \lambda_p e_p \end{bmatrix}$$

(son ortonomales)

$\Sigma var = \Sigma e_i \lambda_i e_i$ al ser ortonomales, su producto punto es 1. $(PP' = I)$

$\lambda I = \lambda = \begin{bmatrix} \lambda_1 & & \\ & \ddots & \\ & & \lambda_p \end{bmatrix}$

$= \Sigma \lambda_i$