21/Marzo/2023

Ejercicio 1. Media y Varianza

$$\bar{r} = \frac{1}{n}\sum_{i=1}^{n} r_i \qquad LI_{\bar{r}} = \frac{1}{2} - Z_{\alpha/2}\left(\frac{1}{\sqrt{12n}}\right) \qquad LS_{\bar{r}} = \frac{1}{2} + Z_{\alpha/2}\left(\frac{1}{\sqrt{12n}}\right) =$$

$$\bar{r} = \frac{\begin{array}{l} 0.8797 + 0.9848 + 0.4557 + 0.917 + 0.8376 + 0.3884 + 0.3469 + 0.1592 \\ + 0.2204 + 0.6235 + 0.6289 + 0.7977 + 0.8536 + 0.5991 + 0.3681 + \\ 0.8750 + 0.5844 + 0.8846 + 0.5461 + 0.2088 + 0.5999 + 0.8147 + 0.3410 \\ + 0.5739 + 0.1525 + 0.8589 + 0.6431 + 0.1492 + 0.3254 + 0.2006 + \\ 0.9996 + 0.7357 + 0.8681 + 0.0856 + 0.4720 + 0.2415 + 0.5613 + \\ 0.5291 + 0.2258 + 0.4272 + 0.3808 + 0.0315 + 0.3188 + 0.4603 + \\ 0.6360 + 0.9606 + 0.7401 + 0.5992 + 0.5027 + 0.0954 \end{array}}{50}$$

$$\bar{r} = \frac{26.6933}{50}$$

$$\bar{r} = 0.533866$$

$$LI_{\bar{r}} = \frac{1}{2} - Z_{\alpha/2}\left(\frac{1}{\sqrt{12n}}\right) = \frac{1}{2} - (1.96)\left(\frac{1}{\sqrt{12(50)}}\right) = 0.419983335$$

$$LS_{\bar{r}} = \frac{1}{2} + Z_{\alpha/2}\left(\frac{1}{\sqrt{12n}}\right) = \frac{1}{2} + (1.96)\left(\frac{1}{\sqrt{12(50)}}\right) = 0.580016664$$

El conjunto de 50 datos con $\bar{r} = 0.533866$ se acepta debido a que se encuentra dentro de los límites de aceptación.

$$V_{(r)} = \frac{\sum_{i=1}^{n} (r_i - \bar{r})^2}{n-1} \qquad LI_{V(R)} = \frac{\chi^2_{1-(\alpha/2);\, n-1}}{12(n-1)} \qquad LS_{V(R)} = \frac{\chi^2_{\alpha/2,\, n-1}}{12(n-1)}$$

$$V_{(r)} = \frac{\begin{aligned}&(0.8797-0.533866)^2+(0.9848-0.533866)^2+(0.4557-0.533866)^2+(0.917-0.533866)^2\\&+(0.8376-0.533866)^2+(0.3884-0.533866)^2+(0.3469-0.533866)^2+(0.1592-0.533866)^2\\&+(0.2204-0.533866)^2+(0.6235-0.533866)^2+(0.6289-0.533866)^2+(0.7977-0.533866)^2\\&+(0.8536-0.533866)^2+(0.5991-0.\ 33866)^2+(0.3681-0.533866)^2+(0.8750-0.533866)^2\\&+(0.5844-0.533866)^2+(0.8846-0.533866)^2+(0.5461-0.533866)^2+(0.2088-0.533866)^2\\&+(0.5999-0.533866)^2+(0.8147-0.533866)^2+(0.3410-0.533866)^2+(0.5739-0.533866)^2\\&+(0.1525-0.533866)^2+(0.8589-0.533866)^2+(0.6431-0.533866)^2+(0.1492-0.533866)^2\\&+(0.3254-0.533866)^2+(0.2006-0.533866)^2+(0.9996-0.533866)^2+(0.7387-0.533866)^2\\&+(0.8681-0.533866)^2+(0.0856-0.533866)^2+(0.4720-0.533866)^2+(0.2415-0.533866)^2\\&+(0.5613-0.533866)^2+(0.5291-0.533866)^2+(0.2258-0.533866)^2+(0.4272-0.533866)^2\\&+(0.3808-0.533866)^2+(0.0318-0.533866)^2+(0.3188-0.533866)^2+(0.4603-0.533866)^2\\&+(0.6360-0.533866)^2+(0.9606-0.533866)^2+(0.7401-0.533866)^2+(0.5992-0.533866)^2\\&+(0.5027-0.533866)^2+(0.0954-0.533866)^2.\end{aligned}}{49}$$

$$V_{(r)} = \frac{3.646391812}{50-1} = \frac{3.64391812}{49}$$

$$V_{(r)} = 0.074416159$$

$$LS_{V(R)} = \frac{\chi^2_{0.05/2,\, 50-1}}{12(50-1)} = \frac{\chi^2_{0.025,\, 49}}{12(49)} = \frac{70.222}{588} = 0.11942517$$

$$LI_{V(R)} = \frac{\chi^2_{1-(0.05/2),\, 50-1}}{12(50-1)} = \frac{\chi^2_{0.975,\, 49}}{12(49)} = \frac{31.555}{588} = 0.053664966$$

Dado que el valor de la varianza: $V(r) = 0.074416159$ está entre los límites de aceptación, podemos decir que no se puede rechazar que el conjunto de 50 números r_i tiene una varianza de $1/12 = 0.8333$.