murray

ore

cuando dividimos $s^2 \div (n)$ es tendensiosa

14 | II / 2022 Sección A

Sesión # 5

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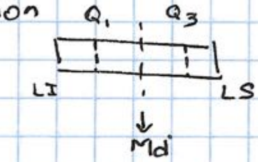
E. descriptiva
- MTC :
- Posición : Q_k, D_n, P_k
- Dispersión : s^2, s

Varianza:
muestral: $n \leq 30$: s^2
poblacional: $31 \leq x$: σ
desviación estandar: $\sqrt{s^2}$, $\sqrt{\sigma^2}$

Posición



$Q_1 = P_{25}$

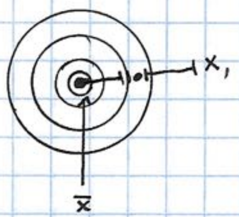
$Q_3 = P_{75}$

$$s^2 = \frac{\Sigma(x_i - \bar{x})^2}{n-1}$$

$$\sigma^2 = \frac{\Sigma(x-\bar{x})^2}{n}$$

$\Rightarrow$ ordenados en magnitud.

$$\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n}}$$



$$\Sigma(x-\bar{x}) = 0$$

x	$x-\bar{x}$	$(x-\bar{x})^2$
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
10	0.1	0.01
9	-0.9	0.81
$\Sigma x = 99$	$\Sigma(x-\bar{x}) = 0$	0.9

$\bar{x} = 9.9$

$$s^2 = \frac{\Sigma(x-\bar{x})^2}{n-1} = \frac{0.9}{10-1} = 0.1$$

$$s = \sqrt{0.1} = 0.3162$$

Método corto varianza :

$$\bar{x} = \frac{\Sigma x}{n}$$

$$s^2 = \frac{\Sigma(x-\bar{x})^2}{n-1}$$

$$s^2 = \frac{\Sigma(x^2 - 2x\cdot\bar{x} + (\bar{x})^2)}{n-1}$$

$$\bar{x} = \frac{\Sigma x}{n}$$

$$s^2 = \frac{\Sigma(x-\bar{x})^2}{n-1}$$

$$s^2 = \frac{\Sigma(x^2 - 2x\bar{x} + \bar{x}^2)}{n-1}$$

$$s^2 = \frac{\Sigma x^2 - 2\Sigma x \cdot \frac{\Sigma x}{n} + \Sigma\left(\frac{\Sigma x}{n}\right)^2}{n-1}$$

$$s^2 = \frac{\Sigma x^2 - 2\frac{(\Sigma x)^2}{n} + \Sigma(1)\left(\frac{(\Sigma x)^2}{n^2}\right)}{n-1}$$

$$s^2 = \frac{\Sigma x^2 - \frac{2(\Sigma x)^2}{n} + n\frac{(\Sigma x)^2}{n^2}}{n+1}$$

$$s^2 = \frac{\Sigma x^2 - \frac{2(\Sigma x)^2}{n} + \left(\frac{(\Sigma x)^2}{n}\right)}{n-1}$$

$$s^2 = \frac{n\Sigma x^2 - (\Sigma x)^2}{n(n-1)}$$

$$s^2 = \underbrace{\frac{\Sigma x^2}{n-1} - \frac{(\Sigma x)^2}{n^2-n}}_{\text{muestral}} = \underbrace{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}_{\text{pobl.}}$$

$\sigma^2 \geq 0$

Para datos frecuenciales : "f"

$$s^2 = \frac{\Sigma f x^2 - \frac{(\Sigma f \cdot x)^2}{n}}{n-1}$$

$s: n \leq 30$

$s = \sqrt{s^2}$ [unidades]

$$\sigma = \frac{\Sigma f \cdot x^2}{n} - \bar{x}^2$$

$s: n > 30$

$\sigma = \sqrt{\sigma^2}$

x	f	f · x	fx^2
1	4	4	$4(1)^2 = 4$
2	3	6	$3(2)^2 = 12$
3	3	9	$3(3)^2 = 27$
4	4	16	$4(4)^2 = 64$
5	5	25	$5(5)^2 = 125$
6	7	42	$7(6)^2 = 252$
7	5	35	$5(7)^2 = 245$
8	5	40	$5(8)^2 = 320$
9	3	27	$3(9)^2 = 243$
10	1	10	$1(10)^2 = 100$
		$\Sigma f x = 214$	$\Sigma f x^2 = 1392$

$$\sigma^2 = \frac{\Sigma f \cdot x^2}{n} - (\bar{x})^2 = \frac{1392}{40} - (5.35)^2$$

$= 6.1775$

$\sigma = 2.4855$

$\bar{x} = 5.35$

Rango $= LS - LI = 4$ $= 10 - 6$

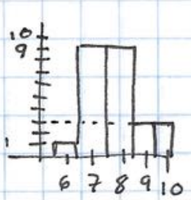
$RI = Q_3 - Q_1 = 8 - 7 = 1$

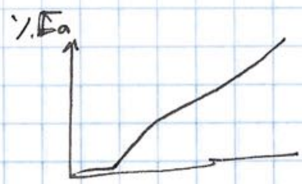
$RS_I = \frac{1}{2}(Q_3 - Q_1) = \frac{1}{2}$

$Q_I = \frac{Q_1 + Q_3}{2} = \frac{(8+7)}{2} = 7.5$

7, 8, 8, 8, 8, 7, 8, 10, 6, 9, 8, 8, 8, 7, 7, 7, 8, 10, 10, 7, 9, 9, 7, 7, 7

x		f	F	% Fa	f · x	fx^2
6	I	1	1	$\frac{1}{25} \cdot 100 = 4$	6	$1 \cdot 6^2 = 36$
7	~~IIII~~ IIII	9	10	40	63	$9(7)^2 = 441$
8	~~IIII~~ IIII	9	19	76	72	$9(8)^2 = 576$
9	III	3	22	88	27	$3(9)^2 = 243$
10	III	3	25	100	30	$3(10)^2 = 300$
					198	1596





Poligono de frec acumulada.

$Q_1 pos = \frac{nk}{4} = \frac{25(1)}{4} = 6.25 \approx 6$

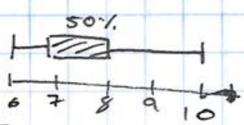
$Q_1 = 7$

$Md = \frac{n+1}{2} = \frac{25+1}{2} = 13$

$Md = 8$

$Q_3 pos = \frac{nk}{4} = \frac{25(3)}{4} = 18.75 \approx 19$

$Q_3 = 8$



$$s = \sqrt{\frac{\Sigma fx^2 - \frac{\Sigma fx^2}{n}}{n-1}}$$

$$s^2 = \frac{\Sigma fx^2}{n-1} - \frac{(\Sigma fx)^2}{n^2 - n}$$

$$s^2 = \frac{1596}{24} - \frac{39204}{600}$$

$$s^2 = \frac{29}{25} \quad s = \frac{\sqrt{29}}{5}$$

$= 1.0770$