Practical no: 3

PROBLEM: Compute first four central moments and then compute Central tendency, Dispersion, Skewness and Kurtosis from given data. Also, interpret the result.

WORKING EXPRESSION;

- Mean $(\bar{x}) = \frac{\Sigma x}{n}$, where n is no. of data.

- Four Central Moments:

$$\mu_1 = \frac{\Sigma(x - x^*)}{n}$$

$$\mu_2 = \frac{\Sigma(x - x^*)^2}{n}$$

$$\mu_3 = \frac{\Sigma(x - x^*)^3}{n}$$

$$\mu_4 = \frac{\Sigma(x - x^*)^4}{4}$$

- For Central Tendency:-

$$\text{Mean}(\bar{x}) = \frac{\Sigma x}{n}$$

- For Dispersion:-

$$S.D = \sqrt{\mu_2}$$

- For Skewness:-

Since, μ_3 is positive,

$$\beta_1 = \frac{\mu_3^2}{\mu_2^3}$$

if μ_3 is negative

$$\gamma_1 = \frac{\mu_3}{\mu_2 \sqrt{\mu_2}}$$

- For Kurtosis:-

$$\beta_2 = \frac{\mu_4}{\mu_2^2}$$

RESULT :-

$\bar{X} = 43$, $n = 10$

$\mu_1 = 0$

$\mu_2 = 386$

$\mu_3 = 774$

$\mu_4 = 242162$

Central Tendency $(\bar{x}) = 43$

S.D = 19.6469 (Dispersion)

$\beta_1 = 0.01042$ (Skewness)

$\beta_2 = 1.62529$ (Kurtosis)

CONCLUSION :

- The moment based coefficient of skewness (β_1) was more than zero. so, distribution was positively right skewed. ($\beta_1 > 0$)
- The moment based coefficient of kurtosis was less than 3. so distribution was platykurtic. ($\beta_2 < 3$)

Practical no: 4

PROBLEM : Compute first four central moments and then compute central tendency, Dispersion, Skewness and Kurtosis from given data. Also, interpret the result.

WORKING EXPRESSION :

- Mean $(\bar{x}) = \frac{\Sigma x}{n}$, where n is no. of data.
- Four Central Moments :

$$\mu_1 = \frac{\Sigma(x - x^*)}{n}$$

$$\mu_2 = \frac{\Sigma(x - x^*)^2}{n}$$

$$\mu_3 = \frac{\Sigma(x - x^*)^3}{n}$$

$$\mu_4 = \frac{\Sigma(x - x^*)^4}{n}$$

- For Central Tendency :

$$\text{Mean}(\bar{x}) = \frac{\Sigma x}{n}$$

- For Dispersion :

$$S.D = \sqrt{\mu_2}$$

- For skewness :

For μ_3 positive,

$$\beta_1 = \frac{\mu_3^2}{\mu_2^3}$$

if μ_3 is negative

$$\gamma_1 = \frac{\mu_3}{\mu_2 \sqrt{\mu_2}}$$

- For Kurtosis :

$$\beta_2 = \frac{\mu_4}{\mu_2^2}$$

RESULT:

$\bar{x} = 70$

$\mu_1 = 0$

$\mu_2 = 605$

$\mu_3 = -6075$

$\mu_4 = 611375$

Central Tendency $(\bar{x}) = 70$

S.D = 24.5967 (Dispersion)

$\beta r_1 = -0.40824$ (skewness)

$\beta_2 = 1.67031$ (Kurtosis)

CONCLUSION:

- The moment based coefficient of skewness (r_1) was less than zero. So, distribution was negatively left skewed. ($r_1 < 0$)
- The moment based coefficient of kurtosis (β_2) was less than 3. So, distribution was platykurtic. ($\beta_2 < 3$)