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FACULTY OF ENGINEERING & TECHNOLOGY

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LECTURE- 15

BSc (AG)
2nd Year , IIIrd Sem.
Statistical Methods
AES-213

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Outline of lecture

- Measure of Dispersion
- Standard deviation definition & formula
- Variance definition & formula
- Merits of S.D. & Variance
- Demerits of S.D. & Variance
- Suggested Readings & References

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Standard deviation

Standard deviation is the most important & common used measure of dispersion.

Standard deviation is the positive square root of the average of squared deviations taken from mean.

It is denoted by sigma σ and defined as-

$$\sigma = \sqrt{\frac{\sum \left(X - \bar{X} \right)^2}{N}}$$

or when class interval & frequency is given

$$\sigma = \sqrt{\frac{\sum f.\left(X - \bar{X} \right)^2}{N}}$$

where,

$\bar{X} = mean$

$X = observations$

$f = frquency$

$N = total\ frequency$

continue…

- Coefficient of standard deviation $= \frac{\sigma}{\bar{X}}$

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- Standard error of mean $= \frac{\sigma}{\sqrt{N}}$

- Coefficient of standard deviation is also called coefficient of dispersion.

Variance

Square of standard deviation is called variance.

It is denoted by σ^2 and define as-

$$\sigma^2 = \frac{\sum \left(X - \bar{X}\right)^2}{N}$$

or when class interval & frequency is given

$$\sigma^2 = \frac{\sum f.\left(X - \bar{X}\right)^2}{N}$$

where,

$\bar{X} = mean$

$X = observations$

$f = frquency$

$N = total\ frequency$

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continue…

- Coefficient of variance $= \frac{\sigma}{\bar{X}} \times 100$

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- Coefficient of variance is also called coefficient of variation.

Properties of Standard deviation & Variance

Merits or Advantages of Standard deviation & Variance :

- It is easy to understand.
- It is based on all the observations.
- It is capable for mathematical calculations.
- It is rigidly defined by mathematical formula.
- It is not affected by fluctuation of sampling.
- It is very useful in correlation.
- It is used in small samples as well as large samples.
- It has greater mathematical significance.

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Demerits or Disadvantages of Standard deviation & Variance :

There are only few disadvantages of standard deviation & variance.

- It is difficult to calculate.

- It consumes much time & labour while computing it.

Suggested Readings & References

1) Statistical Methods: P.N. Arora, Sumeet Arora & S. Arora; S. Chand & Company Ltd.

2) Fundamental of Mathematical Statistics: S.C. Gupta & V. Kapoor; Sultan Chand & Sons.

3) Statistics: M.R. Spiegel; Schaum's Outline Series, Mc-Graw Hill Publication.

4) Advanced Engineering Mathematics: Erwin Kreyszig; John Wiley & Sons Inc.

5) Elements of Statistics: J.P. Chauhan & S. Kumar; Krishna Publication.

* THANK YOU *