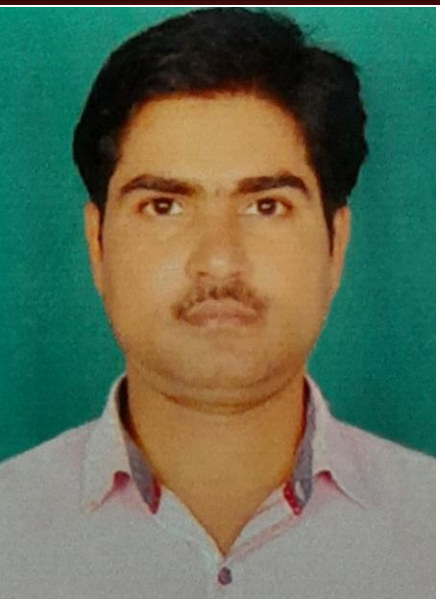
Elements Of Statistics
Class-BCA III Semester



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OUTLINE-

UNIT :- II

CENTRAL TENDENCY

MODE

GEOMETRIC MEAN

HARMONIC MEAN

Mode

- The value occurring the largest no. of times in a series. That is the value having the maximum frequency.
- Is calculated for discrete and continuous frequency distributions only.

For ex. How to obtain the mode for 1,2,3,4,5 ?

as the maximum frequency is 1 and each observation has frequency 1.

Mode – Discrete Frequency Distribution

- The value corresponding to maximum frequency is the mode.

For ex. The weight 132 pounds has the maximum frequency 3. Hence 130 pounds is the mode for this frequency distribution.

Wt. in pounds	No.of students
120	1
130	**3**
132	2
135	2
140	1
141	1
Total	10

Mode – Continuous Frequency Distribution

1. Look for the class-interval with maximum frequency. This is the modal class.
2. Note down the following:

L_1 = lower limit of the modal class.

i = width of class-interval

f_0 = frequency of class preceding the modal class.

f_1 = frequency of modal class.

f_2 = frequency of class succeeding the modal class.

Mode: Formula for Continuous Frequency Distribution

$$\text{Mode} = L1 + \frac{h(f1 - f0)}{2f1 - f0 - f2}$$

Empirical Relationship between Mean, Median & Mode

Mode = 3 Median – 2 Mean

Geometric Mean

- Individual Series

$$G = (x_1.x_2.x_3.\ldots\ldots x_n)^{1/n}$$

$$\log G = \frac{1}{n}(\log x_1 + \log x_2 + \ldots + \log x_n)$$

$$G = \text{antilog}\left(\frac{1}{n}\Sigma \log x\right)$$

Geometric Mean

- Discrete Frequency Distribution

$$G = (x_1^{f1}.x_2^{f2}.....x_n^{fn})^{1/N}$$

$$\log G = \frac{1}{N}(f_1 \log x_1 + f_2 \log x_2 + ... + x_n \log f_n)$$

$$G = \text{antilog} \left(\frac{1}{N} \Sigma f_i \log x_i \right)$$

Geometric Mean

- Continuous Frequency Distribution

- Formula same as in case of discrete frequency distribution with x (as observations) replaced by x (as mid-values)

Harmonic Mean

- Reciprocal of A.M of reciprocals

- Individual Series

$$H = \frac{1}{\frac{1}{n}\left(\frac{1}{x_1} + \frac{1}{x_2} + \ldots\ldots + \frac{1}{x_n}\right)}$$

$$H = \frac{n}{\Sigma\left(\frac{1}{x}\right)}$$

Harmonic Mean

-Discrete Frequency Distribution

$$H = \frac{1}{\frac{1}{N}\left(\frac{f_1}{x_1} + \frac{f_2}{x_2} + \ldots\ldots + \frac{f_n}{x_n}\right)}$$

$$H = \frac{N}{\Sigma\left(\frac{f_i}{x_i}\right)}$$

Harmonic Mean

- Continuous Frequency Distribution

- Formula same as that of Discrete Frequency Distribution with x (as observations) replaced by x (as mid values).

A.F = (L.L of 1st C.I – U.L of 2nd C.I)/2

= (50-49)/2

= 0.5

New C.I

L.L of new C.I = L.L of original C.I – A.F

U.L of new C.I= U.L of original C.I + A.F

For ex. For 1st C.I,new L.L = 50-0.5

= 49.5

new U.L = 59 +0.5

= 59.5 and so on.

Now Continue as usual.

Questions:-

- **What is mode explain it with examples?**
- **Define geometric mean with example?**
- **Define harmonic mean with example?**

Reference Books:

1. S.C.Gupta - Fundamentals of Statistics - Sultan Chand & sons , Delhi.
2. D.N.Elhance - Fundamentals of statistics - Kitab Mahal, Allahabad.
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4. Goon, Gupta And Dasgupta - Fundamentals of Statistics - The world press private ltd. , Kolkata.
5. Hogg R.V. and Craig R.G. – Introduction to mathematical statistics Ed 4 {1989} – Macmillan Pub. Co. New York.
6. Gupta S.P. – Statistical Methods, Sultan Chand and Sons New Delhi

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Thanks