Lecture 3

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Outline of Lecture 3

1. Construction of Discrete Frequency Distrubution.
2. Continous Frequency Distrubution.
3. Some Useful Definitions.

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Construction of Discrete Frequency Distrubution

Example 1: The following data shows the no. of children in 40 families.

1,2,6,5,1,5,1,3,2,6, 2,3,4,2,0,0,4,4,3,2

2,0,0,1,2,2,4,3,2,1, 0,5,1,2,4,3,4,4,1,6.

Construct a discrete frequency distrubution for the given data.

The discrete freq. dist. for given data is shown in table

No. of children	no. of families (frequency)
0	5
1	7
2	10
3	5
4	7
5	3
6	3
Total	40

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Continous Frequency Distrubution

Example 2: Frequency distrubution of the weights of a group of 60 students in class are given below:

Weight (kg)	no. of students (frequency)
30 – 34	3
35 – 39	5
40 – 44	12
45 – 49	18
50 – 54	14
55 – 59	6
60 – 64	2
Total	60

Some Useful Definitions

Class Interval: An interval defining a class is called a class interval or simply class.

Class Limits: The smallest and largest values that define a given class interval are referred to as its class limits.

The smallest no. is called the lower class limit and the larger no. is called the upper class limit.

Types of Classes: There are two classes either Inclusive method or Exclusive method

Inclusive Method: Grouping of data into different classes such that both the lower and upper class limits of each class interval included in that class is called grouping by "Inclusive method".

For example, the marks obtained by students in a class may be grouped as $0-9$, $10-19$, $20-29$, ..., where the class interval $0-9$ includes all values from 0 to 9 (both inclusive), the class interval $10-19$ includes all values from 10 to 19, and so on.

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Exclusive Method: Grouping of data into different classes such that the upper class limit of one class is same as the lower class limit of the next class is called grouping by "Exclusive method".

For example, if the marks obtained by students in a class are grouped as $0-10$, $10-20$, $20-30$, ..., then the class interval $0-10$ includes all values which are greater than or equal to 0 but less than 10, the class interval $10-20$ includes all values which are greater than or equal to 10 but less than 20 and so on.

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Class Boundaries: The class boundaries are the values halfway between the upper class limit of one class and the lower class limit of the next class. Each class has an upper and lower class boundaries.

If d is the gap between the upper class limit of one class and the lower class limit of the next class, the class boundaries for any class are given by

$$\text{Lower class boundaries} = \text{Lower class limit} - \frac{d}{2}$$

$$\text{Upper class boundaries} = \text{Upper class limit} + \frac{d}{2}.$$

For the frequency distribution given in Example 2 the gap between the upper class limit of one class and the lower class limit of the next class is d = 1. Dividing it by 2 we get 1/2 or 0.5. Subtracting this value from all lower class limits and adding the same to all upper class limits, we obtain the class boundaries as:

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Frequency distrubution for the weights of a group of 60 students

Class Interval	class boundaries	no. of students (freq.)
30 – 34	29.5 – 34.5	3
35 – 39	34.5 – 39.5	5
40 – 44	39.5 – 44.5	12
45 – 49	44.5 – 49.5	18
50 – 54	49.5 – 54.5	14
55 – 59	54.5 – 59.5	6
60 – 64	59.5 – 64.5	2

Some Useful Definitions

Class Width: The difference between the upper and the lower class boundaries of a class interval is called the class width (or class size)

In previous table all class intervals are of equal width. The width of each class is 5.

Class frequency: The no. of observations that fall in a particular class is called the class frequency and is denoted by the letter f.

Cumulative Frequency Distribution: The cumulative frequency can be classified into two types:

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"Less than"Cumulative Frequency: The no. of observations which are less than the upper class boundary of a given class interval is called the "less than"cumulative frequency of that class. Thus the "less than"cumulative frequency of a given class interval is the sum of the frequency of the given class and the frequencies of all classes having a class mark less than that of the given class.

More than Cumulative Frequency: The no. of observations which are greater than the lower class boundary of a given class interval is called the more than cumulative frequency of that class. Thus the "more than"cumulative frequency of a given class interval is the sum of the frequency of the given class and the frequencies of all classes having a class mark greater than that of the given class.

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Some Useful Definitions

Cumulative Frequency distrubution

Class Interval	freq.	Cum.Freq.(Less)	Cum.Freq.(More)
30 – 34	3	3	60
35 – 39	5	8	57
40 – 44	12	20	52
45 – 49	18	38	40
50 – 54	14	52	22
55 – 59	6	58	8
60 – 64	2	60	2

bibliography

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- S.C. Gupta and V.K. Kapoor, Fundamentals of Statistics.

Thanks !!!