**Practical no 5:**

**STATEMENT:**

CALCULATE THE FIRST FOUR MOMENTS ABOUT THE MEAN FROM THE FOLLOWING DISTRIBUTION AND THEN FIND THE MEASURES OF SKEWNESS AND KURTOSIS DEPENDS UPON THE DISTRIBUTION:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| f | 5 | 10 | 30 | 70 | 140 | 200 | 140 | 70 | 30 | 10 | 5 |

**WORKING EXPRESSION:**

1. **Moments:**

Moments are the arithmetic average of various power of deviations of observations in which deviations are taken from mean or assumed mean which are used to determine the characteristics of frequency distribution. i.e. central tendency, dispersion, skewness and kurtosis.

Types of moments

1. Central moments
2. Raw moments
3. **Moments about the mean:**

The arithmetic average of various power of deviations of observations in which deviations are taken from mean (AM) are called central moments or moments about the mean. And it can be calculated by the given formula.

µr = 

1. **Measure of Skewness Based on Moments:**

karl pearson defined the coefficient of skewness based upon second central moment and third central moment which is denoted by (β1) and given by the formula:

(β1) = µ32 / µ23

1. **Measures of Kurtosis based on Moments:**

Karl Pearson coefficient of kurtosis based upon second central moment and fourth central moment which is denoted (β2) by and given by the formula:

(β2) = µ4 / µ22

**CALCULATION:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **X** | **f** | **fx** |  |  |  |  |
| 0 | 5 | 0 | -25 | 125 | -625 | 3125 |
| 1 | 10 | 10 | -40 | 160 | -640 | 2560 |
| 2 | 30 | 60 | -90 | 270 | -810 | 2430 |
| 3 | 70 | 210 | -140 | 280 | -560 | 1120 |
| 4 | 140 | 560 | -140 | 140 | -140 | 140 |
| 5 | 200 | 1000 | 0 | 0 | 0 | 0 |
| 6 | 140 | 840 | 140 | 140 | 140 | 140 |
| 7 | 70 | 490 | 140 | 280 | 560 | 1120 |
| 8 | 30 | 240 | 90 | 270 | 810 | 2430 |
| 9 | 10 | 90 | 40 | 160 | 640 | 2560 |
| 10 | 5 | 50 | 25 | 125 | 625 | 3125 |
|  | 710 | 3550 | 0 | 1950 | 0 | 18750 |
|  |  |  | 0 | 1950 | 0 | 18750 |

1. **Mean **

=  = 5

1. **Moments about the mean:**

µ1 =  =  = 0

µ2 = =  = 2.746

µ3 =  =  = 0

µ4  =  =  = 26.408

1. **Skewness (β1)**

= µ32 / µ23

= 0 / 20.7062

= 0

1. **Coefficient of kurtosis (β2)**

= µ4 / µ22

= 26.408 / 7.540

= 3.502

**RESULT:**

The first four moments are 0, 2.746, 0, 26.408 respectively. And measures of skewness and kurtosis are 0 and 3.502 respectively.

**CONCLUSION:**

Hence, first four moments from mean, skewness and kurtosis can be computed in MS WORD and MS EXCEL.