# PS.PT.MGR.Government Arts and Science College
# Puthur, Sirkali-609108.

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## 16CCCCM8 -Business Tools for Decision Making

## Semester-IV

### UNIT-1

**Measures of central tendency**

A number or a quantity which is a representative of a set of data is called central tendency. This single value describes the characteristics of the entire mass of data and is called as central value or average. Individual series is the arrangement of raw data individually. Discrete series means where frequencies of a variable are given but the variable is without class intervals. Continuous data includes any value within range.

**1. Mean**

**Individual series** = $\overline{X} = \frac{\Sigma x}{n}$

**Discrete series** = $\overline{X} = \frac{\Sigma fx}{\Sigma f}$

**Continuous series** = $\overline{X} = A + \frac{\Sigma fd}{\Sigma f} \times c$

**Median**

**Individual series** = $\left(\frac{N+1}{2}\right)$

**Discrete series** = $\left(\frac{N+1}{2}\right)$

**Continuous series** = $M = L + \frac{\frac{N}{2} - cf}{f} \times c$

**Mode:**

**Individual series** = **value that occurs maximum times**

**Discrete series** = **grouping table method is used**

**Continuous series** = $L + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times c$

**Geometic mean:**

**Individual series** = **antilog of** $\left(\frac{\Sigma \log x}{n}\right)$

**Discrete series** = **antilog of** $\left(\frac{\Sigma f \log x}{\Sigma f}\right)$

**Continuous series** = **antilog of** $\left(\frac{\Sigma f \log m}{\Sigma f}\right)$

**Harmonic mean:**

**Individual series** = $H.m = \frac{n}{\Sigma \frac{1}{x}}$

**Discrete series** = $H.m = \frac{\Sigma f}{\Sigma f \frac{1}{m}}$

**Continuous series** = $H.m = \frac{\Sigma f}{\Sigma f \frac{1}{m}}$

## UNIT-II

**Measures of variation**

**It represents the amount of dispersion in a dataset. It define how far away the data points tend to fall from the center.**

**Range:**

**Individual series** = **L-S**

**Discrete series** = **Range = L of x** = **L-S**

**Continuous series** = **Range = L-S**

**Co-efficient of Range** = $\frac{L-S}{L+S}$

**Quartile deviation**

**Individual series** = $Q_1 = \left(\frac{N+1}{4}\right)$

$Q_3 = 3\left(\frac{N+1}{4}\right)$

$QD = \frac{Q_3 - Q_1}{2}$

**Co-efficient of QD** = $\frac{Q_3 - Q_1}{Q_3 + Q_1}$

**Discrete series** = $\frac{Q_3 - Q_1}{Q_3 + Q_1}$

**Continuous series** = $QD = \frac{Q_3 - Q_1}{2}$

$Q_1 = L + \frac{\left(\frac{N}{4} - cf\right)}{f} \times c$

$Q_3 = L + \frac{3\left(\frac{N}{4} - cf\right)}{f} \times c$

**Co-efficient of QD** = $\frac{Q_3 - Q_1}{Q_3 + Q_1}$

**Standard deviation**

**Individual series** = $\sigma$ = $\sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$

**Discrete series** = $\sigma$ = $\sqrt{\frac{\Sigma fx^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$

**Continuous series** = $\sigma$ = $\sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd}{\Sigma f}\right)^2} \times c$

**Mean deviation**

**Individual series** = **M.D** = $\frac{\Sigma(x - \bar{x})}{n}$ = $\bar{x} = \frac{\Sigma x}{n}$

**Discrete series** = **M.D** = $\frac{\Sigma f(x - \bar{x})}{\Sigma f}$ = $\bar{x} = \frac{\Sigma fx}{\Sigma f}$

**Continuous series** = **M.D** = $\frac{\Sigma f(x - \bar{x})}{\Sigma f}$ $\bar{X} = A + \frac{\Sigma fd}{\Sigma f} \times c$

**Karlpearson co-efficient** = $\frac{Mean - Mode}{S.D}$

**Individual series** = **Mean** = $\bar{X} = \frac{\Sigma x}{n}$

**Mode = value that occurs maximum times**

**S.D** = $\sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$

**Discrete series** = **Mean** = $\bar{X} = \frac{\Sigma fx}{\Sigma f}$

**Mode = grouping table method is used**

**S.D** = $\sigma = \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$

**Continuous series** = **mean** = $A + \frac{\Sigma fd}{\Sigma f} \times c$

**Mode** = $L + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times c$

$$\textbf{S.D} = \sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd}{\Sigma f}\right)^2} \times c$$

$$\textbf{Bowley's co-efficient} = \frac{Q_3 - Q_1 - 2\,\text{mediam}}{Q_3 - Q_1}$$

**Individual series** =

$$Q_3 = 3\left(\frac{N+1}{4}\right)$$

$$Q_1 = \left(\frac{N+1}{4}\right)$$

$$\textbf{M} = \frac{N+1}{2}$$

**Discrete series** =

$$Q_1 = \left(\frac{N+1}{4}\right)$$

$$Q_3 = 3\left(\frac{N+1}{4}\right)$$

$$Q.D = \frac{Q_3 - Q_1}{2}$$

**Median**

$$\textbf{M} = \frac{N+1}{2}$$

**Continuous series** =

$$Q_1 = L + \frac{\left(\frac{N}{4} - cf\right)}{f} \times c$$

$$Q_3 = L + \frac{3\left(\frac{N}{4} - cf\right)}{f} \times c$$

$$M = L + \frac{\frac{N}{2} - cf}{f} \times c$$

## UNIT-III

**Correlation is a statistical measure which determines co-relationship or association of two variables.regression describes how an independent variable is numerically related to the dependent variable. to represent linear relationship between two variables.**

**Correlation** = $\gamma$ = $\frac{\Sigma xy}{\Sigma x^2 \Sigma y^2}$

= $X = X - \overline{X}$ $\overline{X} = \frac{\Sigma x}{n}$

= $Y = Y - \overline{Y}$ $\overline{Y} = \frac{\Sigma y}{n}$

**Spearman's rank correlation**

P = $1 - \frac{6\Sigma d^2}{N(N^2 - 1)}$

D = X-Y

**Regression equation**

X on Y

$X = X - \overline{X}$ $b_{xy}(y - \bar{y})$

$b_{xy} = \frac{\Sigma xy}{\Sigma y^2}$ $\overline{X} = \frac{\Sigma x}{n}$

Y on x

$Y = Y - \overline{Y}$ $b_{xy}(x - \bar{x})$

$b_{yx} = \frac{\Sigma xy}{\Sigma x^2}$ $\overline{Y} = \frac{\Sigma y}{n}$

**Concurrent deviation**

$\gamma_c$ = $\pm\sqrt{\frac{\pm 2C - N}{N}}$

## UNIT-IV

### Measurement of Trend

### Free hand graphic method.

The values of a time series are plotted on a graph paper in the form of a historigram

### Method of Semi Average

Divide the data into two equal parts with respect to time. And then we plot the arithmetic mean of the sets of values of Y against the center of the relative time span. The trend values can then be read from the graph corresponding to each time period.

### Moving Average Method

This method uses the concept of ironing out the fluctuations of the data by taking the means. It measures the trend by eliminating the changes or the variations by means of a moving average.

### Least Square Method

Method for finding the best fit of a set of data points. It minimizes the sum of the residuals of points from the plotted curve. It gives the trend line of best fit to a time series data. This method is most widely used in time series analysis. **Y = a + b X**

## UNIT-V

Index Numbers which was developed for measuring the effect of change in prices have become one of the most widely used statistical devices today. They are used to feel the pulse of the economy and as indicators of inflationary or deflationary tendencies. That is why they are described as barometers of economic activity.

**Laspeyre's Index** = $\frac{\Sigma P_1 q_0}{\Sigma P_0 q_0} \times 100$

**Paasche's Index** = $\frac{\Sigma P_1 q_1}{\Sigma P_0 q_1} \times 100$

**Fisher's index** = $\sqrt{\frac{\Sigma P_1 q_0}{\Sigma P_0 q_0} \times \frac{\Sigma P_1 q_1}{\Sigma P_0 q_1}} \times 100$

**Marshall** = **edge worth index number**

= $\frac{\Sigma P_1 q_0 + \Sigma P_1 q_1}{\Sigma P_0 q_0 + \Sigma P_0 q_1} \times 100$

### Simple aggregate index

$$\frac{\Sigma P_1}{\Sigma P_0} \times 100$$

**Weight aggregate index**

$$\frac{\Sigma P_1 w}{\Sigma P_0 w} \times 100$$

**Factors reversal test**

$$P_{01} \times q_{01} = \frac{\Sigma P_1 q_1}{\Sigma P_0 q_0}$$

$$P_{01} = \sqrt{\frac{\Sigma P_1 q_0 + \Sigma P_1 q_1}{\Sigma P_0 q_0 + \Sigma P_0 q_1}}$$

$$q_{01} = \sqrt{\frac{\Sigma P_1 q_0 + \Sigma P_1 q_1}{\Sigma P_0 q_0 + \Sigma P_0 q_1}}$$

**Time reversal test**

$$P_{01} \times q_{01} = 1$$

$$P_{01} = \sqrt{\frac{\Sigma P_1 q_0}{\Sigma P_0 q_0} \times \frac{\Sigma P_1 q_1}{\Sigma P_0 q_1}}$$

$$P_{10} = \sqrt{\frac{\Sigma P_0 q_1}{\Sigma P_1 q_1} \times \frac{\Sigma P_0 q_0}{\Sigma P_1 q_0}}$$

**Fixed base Index**

$$= \frac{\text{current year CBI} \times \text{Previous year FBI}}{100}$$

**Current Base Index**

$$= \frac{\text{Fixed Base index of that year}}{\text{FBI of the previous year}} \times 100$$

**Consumer price index**

**Family budget method A. M** $= \frac{\Sigma IW}{\Sigma W}$

**G.M** $= \text{Antilog of} \left( \frac{\Sigma W \log I}{\Sigma W} \right)$

**Aggregate expenditure method**

$$= \frac{\Sigma p_1 q_o}{\Sigma p_0 q_0} \times 100$$