

CORRELATION & REGRESSION

①

Relationships between the variables are not functional relationships are called statistical relationships. The degree of statistical relationship bet. 2 variables can be measured by means of correlation & regression analysis in statistics.

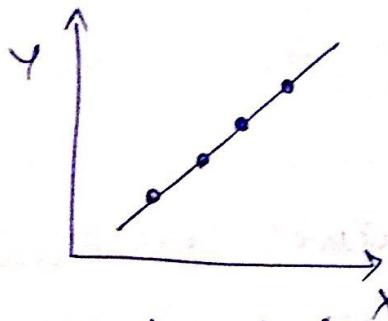
Correlation analysis describes the methods to find out if a statistical relationship between the quantitative variables exists or not. The methods of estimating the value of one variable from the known value of the other variable form a part of regression analysis. Correlation & regression as statistical devices to measure the amount of similarity & variation i.e. the degree of association between series of pairs of observations of 2 variables.

CORRELATION :

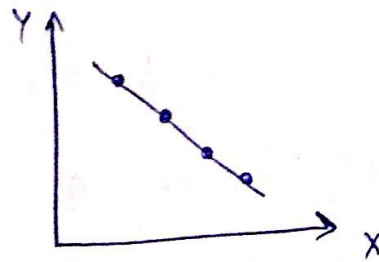
Whenever 2 variables, X & Y are so related that a change in one variable appears to be accompanied by a change in the other variable, the two variables are said to be correlated & this inter-dependence is called correlation or covariation. The tendency of simultaneous variation between 2 variables is called correlation.

① Scatter diagram method —

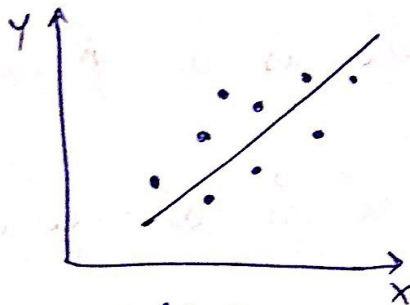
It is a graphic device for drawing certain conclusions about the correlation between 2 variables.



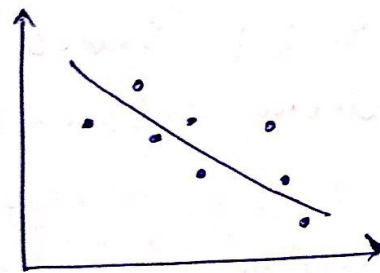
(i) Perfect positive correlation



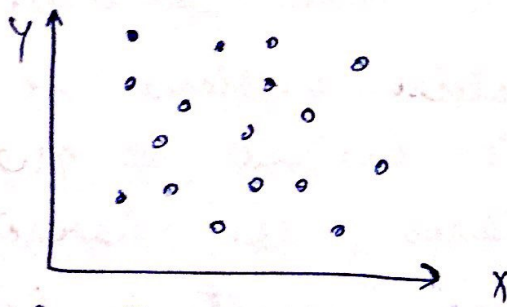
(ii) Perfect negative correlation



(iii) Positive correlation



(iv) Negative correlation



(v) Zero correlation

② Karl Pearson's Coefficient of correlation —

It is also called total correlation or product moment correlation. This coefficient of correlation is a measure of the degree of relationship between 2 variables X & Y . It gives the extent to which sample observations on X are correlated with sample observations on Y .

The coefficient of correlation, denoted by ' r ', is defined in such a way as to be a pure number so that the units of X & Y do not affect its value. The value of r lies between -1 and $+1$.

$r = +1$ shows a perfect positive correlation.

$r = -1$ " " " " negative " " .

$r = 0$ " that X & Y are not correlated.

→ $0 < r < 1$ shows that there is a positive correlation between X & Y .

→ $-1 < r < 0$ shows that there is a negative correlation between X & Y .

③ Spearman's Coefficient of Rank Correlation.

In some of the statistical problems, we need qualitative measurements instead of quantitative measurements. For instance, the characteristics i.e. beauty, intelligence, honesty, politeness, soft spokenness, etc cannot be measured quantitatively. In these problems, we assign ranks to various individual characteristics. The best individual is given the rank one, the next rank two & so on.