Ch 6 Correlation

- Scatter diagram
- Correlation coefficient
- Partial correlation
- Multiple correlation
- Regression

1] Scatter diagram.

x axis	y axis	relationship.
→	value ↑	+ve
→	value ↓	−ve
→	Scattered	No relation.

x → independent variable
y → dependent variable

2] Correlation Coefficient (r)

range : [−1, 1]

r → Also known as pearson's correlation / product moment correlation coeff.

$$r = \begin{cases} 0 - 0.25, & \text{weak} \\ 0.25 - 0.75, & \text{intermediate} \\ 0.75 - 1, & \text{Strong} \end{cases}$$

$$r = \frac{\Sigma xy - \frac{\Sigma x \Sigma y}{n}}{\left[\left(\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right)\left(\Sigma y^2 - \frac{(\Sigma y)^2}{n}\right)\right]^{1/2}}$$

$r \rightarrow$ +ve direct relationship
-ve indirect relationship

→ for pearson correlation (r)

$$r = \frac{\Sigma (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma[(x_i - \bar{x})^2]\,\Sigma[(y_i - \bar{y})^2]}}$$

3.] Partial correlation.

$$(xy \cdot z) = \frac{r_{xy} - (r_{yz})(r_{zx})}{\sqrt{(1 - r^2_{yz})(1 - r^2_{zx})}}$$

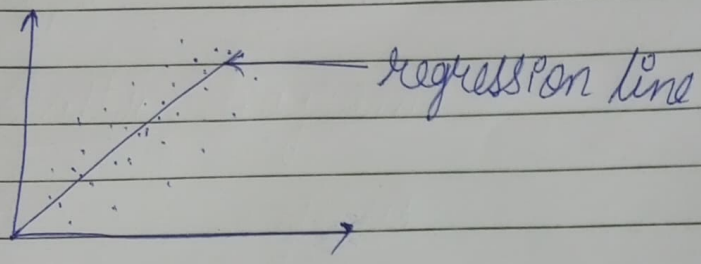
~~$r = \Sigma$~~

4.] Multiple correlation.

$$R_{xyz} = \sqrt{\frac{r^2_{xz} + r^2_{yz} - 2\, r_{xy} r_{yz} r_{zx}}{(1 - r^2_{xy})}}$$

6.] Regression

$y \rightarrow$ criterion $X \rightarrow$ predictor
slope $\rightarrow$ regression coefficient
intercept $\rightarrow$ regression constant



least squares method

$$b_1 = \frac{\Sigma xy - \frac{\Sigma x \Sigma y}{n}}{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}$$

regression eq^n $\hat{y} = \bar{y} + b(x - \bar{x})$