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FACULTY OF ENGINEERING & TECHNOLOGY

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LECTURE- 23

BSc (AG)
2nd Year , IIIrd Sem.
Statistical Methods
AES-213

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Outline of lecture

- Linear Regression Equations
- Linear Regression Definition
- Equations of Lines of Regression
- y on x line
- x on y line
- Relation between Coefficient of Correlation & Coefficient of Regression
- Suggested Readings & References

Linear Regression

If a relation between two variables x and y exits then the dots of the scatter diagram will more or less concentrated around a curve which is the **curve of regression**.

If this curve is a straight line then it is called **line of regression** and also called **linear regression**.

There are two lines of regression-

- y on x line
- x on y line

Equations of lines of regression

Let y = ax+b is an equation of straight line. ‘r’ is a coefficient of correlation. x bar and y bar is a mean of x and y series respectively.

- y on x linear regression line is-

$$(y-\bar{y})=\frac{r.\sigma_y}{\sigma_x}(x-\bar{x})$$

$$or$$

$$(y-\bar{y})=b_{yx}(x-\bar{x})$$

Equations of lines of regression continue

- x on y linear regression line is-

$$(x-\bar{x})=\frac{r.\sigma_x}{\sigma_y}(y-\bar{y})$$

$$or$$

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

where,

$\bar{x} = mean\ of\ x\ series$

$\bar{y} = mean\ of\ y\ series$

$\sigma_x = s.d.\ of\ x\ series$

$\sigma_y = s.d.\ of\ y\ series$

$b_{yx} = coefficient\ of\ regression\ of\ y\ on\ x\ line$

$b_{xy} = coefficient\ of\ regression\ of\ x\ on\ y\ line$

Relation between coefficient of correlation & regression coefficients

Let y = ax+b is an equation of straight line. ‘r’ is a coefficient of correlation.

Then relation between coefficient of correlation & regression coefficients is

$$r^2 = b_{yx}.b_{xy}$$

Hence coefficient of correlation is geometric mean of regression coefficients

Suggested Readings & References

1) Statistical Methods: P.N. Arora, Sumeet Arora & S. Arora; S. Chand & Company Ltd.

2) Fundamental of Mathematical Statistics: S.C. Gupta & V. Kapoor; Sultan Chand & Sons.

3) Statistics: M.R. Spiegel; Schaum's Outline Series, Mc-Graw Hill Publication.

4) Advanced Engineering Mathematics: Erwin Kreyszig; John Wiley & Sons Inc.

5) Elements of Statistics: J.P. Chauhan & S. Kumar; Krishna Publication.

* THANK YOU *