LAB. METEOROLOGICAL DATA ANAYSIS .... FOURTH STAGE

(The second Semester)

Department of Atmospheric Sciences

2021 – 2022

Lecturers: **L. Ruaa mazin , A.L. Yasamin qusay , A.L. Zahraa araf , A.L. Luma Mahdi** , **A.L. Salwa salman**

Preparing by: L. Ruaa mazin , A.L. Zahraa araf , A.L. Luma mahdi

The Coefficient of Determination (R2):

The coefficient of determination R^2 is used to find out the number of points on the drawn regression line, which shows the relationship between the independent variable and the dependent variable whose value ranges between 0 and 1.

If the coefficient is 0.80, then 80% of the points should fall within the regression line. Values of 1 or 0 would indicate the regression line represents all or none of the data, respectively. A higher coefficient is an indicator of a better goodness of fit for the observations.

$$R^2 = \frac{b^2 \sum \left(X_i - \overline{X}\right)^2}{\sum \left(Y_i - \overline{Y}\right)^2} = \frac{b^2 \left(\sum X_i^2 - \frac{\left(\sum X_i\right)^2}{n} \right)}{\left(\sum Y_i^2 - \frac{\left(\sum Y_i\right)^2}{n} \right)}$$

or

$$R2 = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2)]}}$$

Example: Find the regression equation for the following data

x	6	8	9	8	7	6	5	6	5	5
y	10	13	15	14	9	7	6	6	5	5

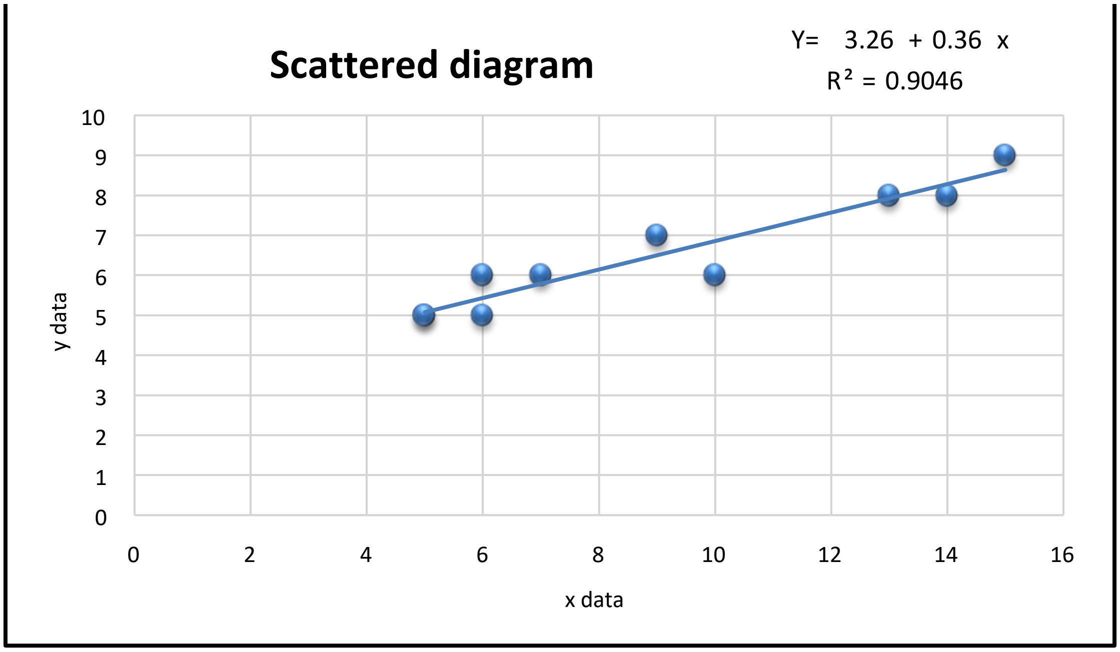
Solution

y	**x**	**xy**	**x^2**	**y^2**
6	10	60	100	36
8	13	104	169	64
9	15	135	225	81
8	14	112	196	64
7	9	63	81	49
6	7	42	49	36
5	6	30	36	25
6	6	36	36	36
5	5	25	25	25
5	5	25	25	25
65	90	632	942	441

b= 0.356

a=3.26

n=10



Standard Error of Estimate:

The standard error coefficient of the calculated or estimated values (Se) This parameter calculates the vertical distance between the points scattered around the regression line and between the regression line and the lower its value, the more accurate the calculated values and vice versa. it is used to check the accuracy of predictions made with the regression line.

$$Se = \sqrt{\frac{\sum\left(Ya - Ye\right)^2}{n-2}}$$

This law requires that we calculate the speculative value for each value of y and this requires that we calculate a and b and the solution becomes complex.

In order to get rid of the complexity in the law, the standard error coefficient of the calculated values can be calculated through the equation below

$$\text{Se} = \sqrt{\frac{Syy - b.Sxy}{n-2}}$$

$$Syy = \sum Y_i^2 - \frac{\left(\sum Y_i\right)^2}{n}$$

$$Sxy = \sum X_i Y_i - \frac{\left(\sum X_i \sum Y_i\right)}{n}$$

Referring to the above example, we extract the value of syy

$\text{Syy}=441-\frac{(65)^2}{10}$

Syy=18.5

$\text{Sxy} =632-\frac{(90*65)}{10}$

Sxy=47

$$\text{Se} = \sqrt{\frac{Syy - b.Sxy}{n-2}}$$

Se= ٠.٤٧