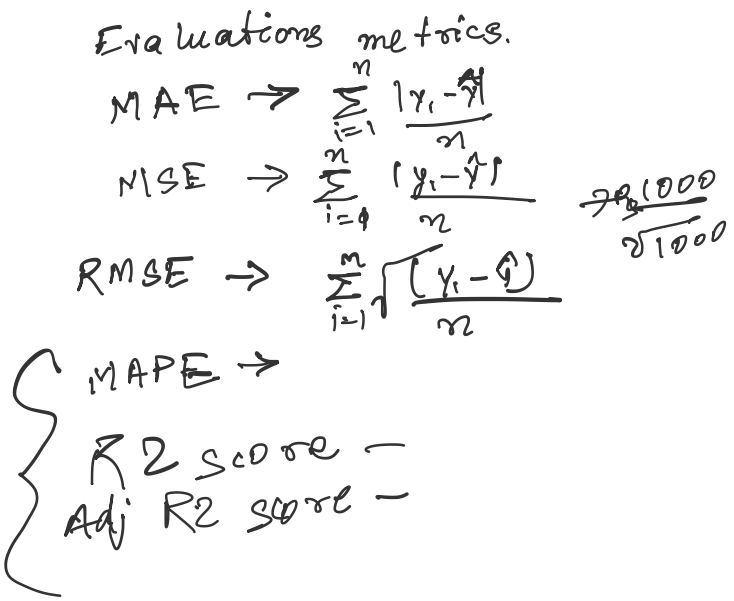
Evaluation metrics for regression

Monday, 9 February 2026 12:51 PM



R Squared Formula

The coefficient of determination which is represented by R^2 is determined using the following formula:

$$R^2 = 1 - (RSS/TSS)$$

Where,

- R^2 *represents the requrired R Squared value,*
- ***RSS*** *represents the residual sum of squares, and*
- ***TSS*** *represents the total sum of squares.*

$$R^2 = 1 - \frac{\Sigma(y_i - \hat{y}_i)^2}{\Sigma(y_i - \bar{y})^2}$$

If we are not provided with the residual sum of squares (RSS), it can be calculated as follows:

$$\mathrm{RSS} = \Sigma_{i=1}^{n}(y_i - \hat{y}_i)^2$$

Where,

- y_i *is the* i^{th} *observation, and*
- $\hat{y}_i$ *is the estimated value of* y_i.

The coefficient of determination can also be calculated using another formula which is given by:

$$R^2 = r^2$$

Where **r** represents the correlation coefficient and is calculated using the following formula:

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

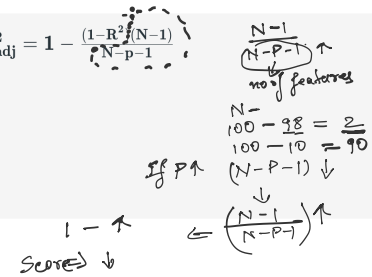
Where,

- ***n*** *is the total observations,*
- ***x*** *is the first variable, and*
- ***y*** *is the second variable.*

Adjusted R Squared Formula

Adjusted R-square formula is given as follows:

$$R^2_{adj} = 1 - \frac{(1 - R^2)(N-1)}{N-p-1}$$



Where,

- R^2 *is the Normal R square value,*
- ***N*** *is the Size of sample, and*
- ***p*** *is the no. of predictors.*

Beta R-Square

R squared and adjusted R squared measures the variability of the value of a variable but beta R square is used to measure how large is the variation in the value of the variable.

R-Squared vs Adjusted R-Squared

The key differences between R-Squared and Adjusted R-Squared, are listed as follows:

Parameter	R-squared	Adjusted R-squared
Meaning	It considers all the independent variables to calculate the coefficient of determination for a dependent variable.	It considers only those independent variables that really affect the value of a dependent variable.
Use	It is used in case of simple linear regression	It is used in the case of linear as well as multiple regression.
Range of Value	Its value ranges from 0 to 1 and can't be negative	Its value depends upon the significance of independent variables and may be negative if the value of the R-square is very near to zero.