

ANOVA: EXPLAINED AND UNEXPLAINED VARIATION

TOTAL VARIATION

SST

$$\boxed{\bar{y}}$$

$$\sum (y_i - \bar{y})^2$$

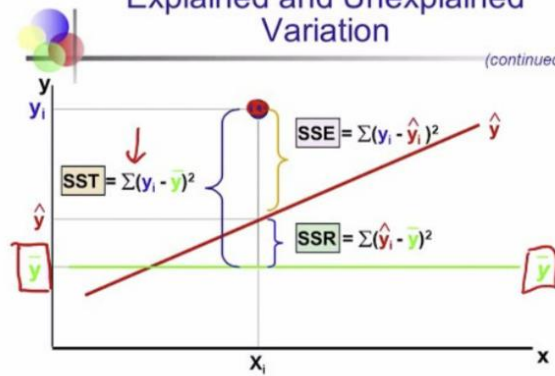
UNEXPLAINED VARIATION

SSE

$$\text{AVERAGE: } MSE = \frac{SSE}{n - (k + 1)}$$

Explained and Unexplained Variation

(continued)



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Chap 14-39

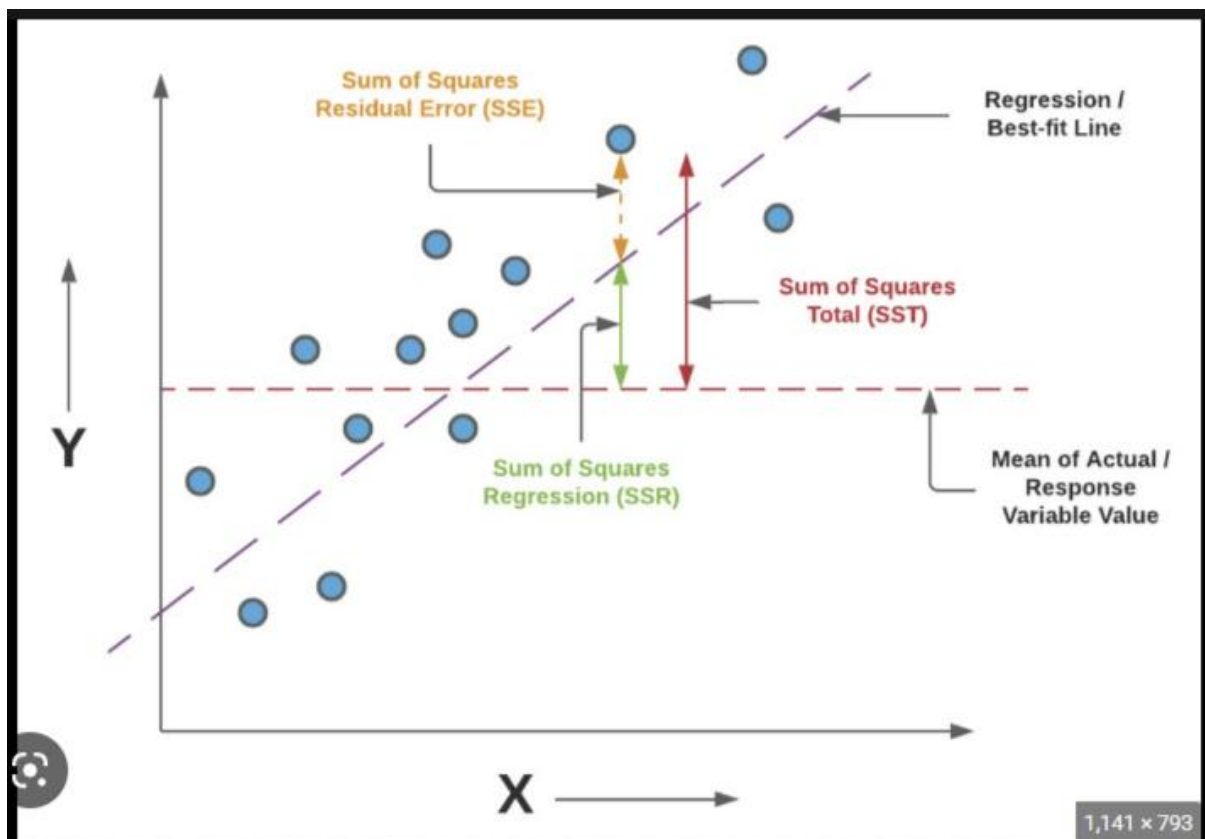
EXPLAINED VARIATION (MODEL)

TOTAL: SSR

$$\text{AVERAGE: } MSR = \frac{SSR}{k}$$



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1,141 x 793

$$\text{MSE} = \frac{1}{n} \sum_{i=1}^n (Y_i - \hat{Y}_i)^2$$

Mean
Error
Squared



1,200 × 675

$$R^2 = 1 - \frac{SS_{RES}}{SS_{TOT}} = 1 - \frac{\sum_i (y_i - \hat{y}_i)^2}{\sum_i (y_i - \bar{y})^2}$$



$$SS_{explained} = \sum_{i=1}^n (\hat{y}_i - \bar{y})^2$$

$$SS_{residual} = \sum_{i=1}^n (y_i - \hat{y}_i)^2$$

$$SS_{Total} = \sum_{i=1}^n (y_i - \bar{y})^2$$

where :

$SS_{explained}$ = explained variation sum of squares

$SS_{residual}$ = unexplained variation sum of squares

SS_{Total} = total variation sum of squares

$$\text{explained variance}(y, \hat{y}) = 1 - \frac{\text{Var}(y - \hat{y})}{\text{Var}(y)}$$

