

R-Square Vs Adjusted R-Square

R^2 always increases when predictors are added, while Adjusted R^2 increases only if the added predictors meaningfully improve the model.

$$R^2 = 1 - \frac{\text{RSS}}{\text{TSS}}$$

$$\text{Adjusted } R^2 = 1 - \left(\frac{1 - R^2}{n - p - 1} \right) (n - 1)$$

P = predictor = number of X

When adjusted the R-square

The adjusted R-square **increase** only if **the new predictor truly helps explain Y**.
So Adjusted R-Square increase only when a **predictor adds real explanatory power**.

Adjusted R-square can be negative

It's mean that 'The model is worst than a simple horizontal line representing the mean of dependent variable'

Signal as **OVER-FITTING!!**