

When we subtract total minus residual error variance ( $var(Y) - MSE$ ), we can call the result “explained error”. It represents the amount of variability in  $y$  that is explained away by regressing on  $x$ . Then we can compute  $R^2$  as:

$$R^2 = \frac{\textit{explainedvariance}}{\textit{totalvariance}} = \frac{var(Y) - MSE}{var(Y)} \quad (1)$$

When  $R^2 \rightarrow 0$  denotes how less information  $x$  holds on  $y$ , while  $R^2 \rightarrow 1$  denotes perfect prediction.