

$$SST = \sum_{i=1}^p (\bar{y}_i - \bar{y})^2$$

$$SSE = \sum_{i=1}^p \sum_{j=1}^{n_i} (y_{ij} - \bar{y}_i)^2$$

$$TSS = \sum_{i=1}^p \sum_{j=1}^{n_i} (y_{ij} - \bar{y})^2$$

$$SS_{XX} = \sum X^2 - \frac{(\sum X)^2}{n}$$

$$SS_{YY} = \sum Y^2 - \frac{(\sum Y)^2}{n}$$

$$SS_{XY} = \sum XY - \frac{\sum X \sum Y}{n}$$

$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x$$

$$\hat{\beta}_1 = \frac{SS_{xy}}{SS_{xx}}$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}$$

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

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

$$S_{\hat{\beta}_1} = \frac{\sqrt{\frac{SSE}{n-2}}}{\sqrt{SS_{xx}}}$$

$$r = \frac{SS_{xy}}{\sqrt{SS_{xx} SS_{yy}}}$$

$$r^2 = 1 - \frac{SSE}{SS_{yy}}$$