Formulae in Correlation and Simple Linear Regression

$$SS_X = \sum\left(x-\bar{x}\right)^2 = \sum x^2 - \frac{\left(\sum x\right)^2}{n}$$

$$SS_Y = \sum\left(y-\bar{y}\right)^2 = \sum y^2 - \frac{\left(\sum y\right)^2}{n}$$

$$SS_{XY} = \sum\left(x-\bar{x}\right)\left(y-\bar{y}\right) = \sum xy - \frac{\left(\sum x\right)\left(\sum y\right)}{n}$$

$$r = \frac{SS_{XY}}{\sqrt{SS_X SS_Y}} \qquad t_{(n-2)} = \frac{r}{\sqrt{(1-r^2)/(n-2)}}$$

$$b_1 = \frac{SS_{XY}}{SS_X} \qquad b_0 = \bar{y} - b_1\bar{x}$$

$$s(b_1) = \frac{s}{\sqrt{SS_X}} \qquad s(b_0) = \frac{s\sqrt{\sum x^2}}{\sqrt{n * SS_X}} \qquad \text{όπου } s = \sqrt{MSE}$$

$$t_{(n-2)} = \frac{b_i - \beta_i}{s(b_i)}$$

$$R^2 = \frac{SSR}{SST} \qquad SS_R = b_1^2\sum\left(x-\bar{x}\right)^2$$

$$y \pm t_{n-2,\frac{a}{2}}\, s\sqrt{1+\frac{1}{n}+\frac{\left(x-\bar{x}\right)^2}{SS_X}} \qquad y \pm t_{n-2,\frac{a}{2}}\, s\sqrt{\frac{1}{n}+\frac{\left(x-\bar{x}\right)^2}{SS_X}}$$

$$F_{r,n-k-1} = \frac{(SSE(r)-SSE)/r}{MSE}$$