Formler

Enkel linjär regression:

$$\widehat{\beta}_1 = \frac{\sum_{i=1}^{n}(X_i-\overline{X})(Y_i-\overline{Y})}{\sum_{i=1}^{n}(X_i-\overline{X})^2} = \frac{n\sum_{i=1}^{n}X_iY_i-\sum_{i=1}^{n}X_i\sum_{i=1}^{n}Y_i}{n\sum_{i=1}^{n}X_i^2-\left(\sum_{i=1}^{n}X_i\right)^2} \qquad \widehat{\beta}_0 = \overline{Y} - \widehat{\beta}_1\overline{X}$$

$$SSY = SSR + SSE$$

$$\sum_{i=1}^{n}(Y_i-\overline{Y})^2 = \sum_{i=1}^{n}(\widehat{Y}_i-\overline{Y})^2 + \sum_{i=1}^{n}(Y_i-\widehat{Y}_i)^2$$

$$S_{Y|X}^2 = \frac{1}{n-2}SSE$$

$$T = \frac{\widehat{\beta}_1-\beta_1^0}{S_{\widehat{\beta}_1}} \qquad \widehat{\beta}_1 \pm t_{n-2,1-\alpha/2}S_{\widehat{\beta}_1} \qquad S_{\widehat{\beta}_1} = \frac{S_{Y|X}}{S_X\sqrt{n-1}}$$

$$\widehat{Y}_{X_0} \pm t_{n-2,\,1-\alpha/2}S_{Y|X}\sqrt{\frac{1}{n}+\frac{(X_0-\overline{X})^2}{(n-1)S_X^2}} \qquad \widehat{Y}_{X_0} \pm t_{n-2,\,1-\alpha/2}S_{Y|X}\sqrt{1+\frac{1}{n}+\frac{(X_0-\overline{X})^2}{(n-1)S_X^2}}$$

$$S_X^2 = \frac{\sum_{i=1}^{n}(X_i-\overline{X})^2}{n-1}$$

$$r = \frac{\sum_{i=1}^{n}(X_i-\overline{X})(Y_i-\overline{Y})}{\left[\sum_{i=1}^{n}(X_i-\overline{X})^2\sum_{i=1}^{n}(Y_i-\overline{Y})^2\right]^{1/2}} = \frac{SSXY}{\sqrt{SSX\cdot SSY}} = \frac{n\sum_{i=1}^{n}X_iY_i-\sum_{i=1}^{n}X_i\sum_{i=1}^{n}Y_i}{\sqrt{n\sum_{i=1}^{n}X_i^2-\left(\sum_{i=1}^{n}X_i\right)^2}\sqrt{n\sum_{i=1}^{n}Y_i^2-\left(\sum_{i=1}^{n}Y_i\right)^2}} =$$

$$= \frac{S_X}{S_Y}\widehat{\beta}_1$$

$$T = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Multipel regression:

$$F = \frac{MSR}{MSE} = \frac{(SSY-SSE)/k}{SSE/(n-k-1)} = \frac{R^2/k}{(1-R^2)/(n-k-1)} \qquad T = \frac{\widehat{\beta}_i-\beta_i^0}{S_{\widehat{\beta}_i}} \qquad \widehat{\beta}_i \pm t_{n-k-1,1-\alpha/2}S_{\widehat{\beta}_i}$$

$$R_{Y|X_1,X_2,\ldots,X_k} = \frac{\sum_{i=1}^{n}(Y_i-\overline{Y})(\widehat{Y}_i-\overline{\widehat{Y}})}{\sqrt{\sum_{i=1}^{n}(Y_i-\overline{Y})^2\sum_{i=1}^{n}(\widehat{Y}_i-\overline{\widehat{Y}})^2}}$$

$$R_{Y|X_1,X_2,\ldots,X_k}^2 = \frac{\sum_{i=1}^{n}(Y_i-\overline{Y})^2-\sum_{i=1}^{n}(Y_i-\widehat{Y}_i)^2}{\sum_{i=1}^{n}(Y_i-\overline{Y})^2} = \frac{SSY-SSE}{SSY}$$

Tidsserieanalys:

$$a_0 = \overline{Y} - b\overline{t}$$

$$S_k = a - a_0 + c_k$$

Logistisk regression:

$$E(Y) = \frac{1}{1+e^{-(\beta_0+\beta_1X_1+\ldots+\beta_kX_k)}}$$