

Formula Sheet

$$b_1 = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sum_{i=1}^n (X_i - \bar{X})^2}$$

$$b_0 = \bar{Y} - b_1 \bar{X}$$

$$s(b_1) = \sqrt{\frac{MSE}{\sum_{i=1}^n (X_i - \bar{X})^2}}$$

$$(b_1 - t(1 - \frac{\alpha}{2}; n - 2)s(b_1); b_1 + t(1 - \frac{\alpha}{2}; n - 2)s(b_1))$$

$$t^* = \frac{b_1}{s(b_1)}$$

$$s^2(b_0) = MSE \left(\frac{1}{n} + \frac{\bar{X}^2}{\sum_{i=1}^n (X_i - \bar{X})^2} \right)$$

$$(b_0 - t(1 - \frac{\alpha}{2}; n - 2)s(b_0); b_0 + t(1 - \frac{\alpha}{2}; n - 2)s(b_0))$$

$$S^2(\hat{Y}_h) = MSE \left(\frac{1}{n} + \frac{(X_h - \bar{X})^2}{\sum_{i=1}^n (X_i - \bar{X})^2} \right)$$

$$(\hat{Y}_h - t(1 - \frac{\alpha}{2}; n - 2)s(\hat{Y}_h); \hat{Y}_h + t(1 - \frac{\alpha}{2}; n - 2)s(\hat{Y}_h))$$

$$s^2(pred) = MSE \left(1 + \frac{1}{n} + \frac{(X_h - \bar{X})^2}{\sum_{i=1}^n (X_i - \bar{X})^2} \right)$$

$$(\hat{Y}_h - t(1 - \frac{\alpha}{2}; n - 2); \hat{Y}_h + t(1 - \frac{\alpha}{2}; n - 2));$$

$$s^2(predmean) = MSE \left[1/m + 1/n + \frac{(X_h - \bar{X})^2}{\sum_{i=1}^n (X_i - \bar{X})^2} \right]$$

$$(\hat{Y}_h - t(1 - \frac{\alpha}{2}; n - 2)s(predmean); \hat{Y}_h + t(1 - \frac{\alpha}{2}; n - 2)s(predmean));$$

$$SSTO = \sum_{i=1}^n (Y_i - \bar{Y})^2$$

$$SSE = \sum_{i=1}^n (\hat{Y}_i - \bar{Y}_i)^2$$

$$\begin{aligned}
SSR &= \sum_{i=1}^n (\hat{Y}_i - \bar{Y}_i)^2 \\
r_{XY} &= \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{(\sum_{i=1}^n (X_i - \bar{X})^2 \sum_{i=1}^n (Y_i - \bar{Y})^2)^{1/2}} \\
e_i &= Y_i - \hat{Y}_i \\
d_{i1} &= |e_{i1} - \tilde{e}_1| \\
d_{i2} &= |e_{i2} - \tilde{e}_2| \\
t_{BF}^* &= \frac{\bar{d}_1 - \bar{d}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \\
s^2 &= \frac{\sum_{i=1}^n (d_{i1} - \bar{d}_1)^2 + \sum_{i=1}^n (d_{i2} - \bar{d}_2)^2}{n - 2} \\
X_{BP}^2 &= SSR^* / 2 \div \left(\frac{SSE}{n} \right)^2 \\
Y_i^\lambda &= \begin{cases} \frac{(Y_i^\lambda - 1)}{\lambda \bar{Y}_g^{\lambda - 1}} & \lambda \neq 0 \\ \bar{y}_g \log Y_i & \lambda = 0 \end{cases}
\end{aligned}$$