$$Z_{stat} = \frac{(\bar{x} - \mu_0)\sqrt{n}}{\sigma} \text{ or } T_{stat} = \frac{(\bar{x} - \mu_0)\sqrt{n}}{s}$$

$$Z_{stat} = \frac{\hat{p} - \pi_0}{\sqrt{\frac{\pi_0(1-\pi_0)}{n}}} \text{ where } \hat{p} = \frac{x}{n} \qquad \chi^2_{stat} = \frac{(n-1)s^2}{\sigma_0^2}$$

And $F_{stat} = \frac{s_i^2}{s_j^2}$ where $\begin{aligned} fd_1 &= n_i - 1 \\ fd_2 &= n_j - 1 \end{aligned}$

The $d_i = x_{1i} - x_{2i}$ with $T_{stat} = \frac{(\bar{d} - \mu_0)\sqrt{n}}{s_d}$

Where $\bar{d} = \frac{\sum d}{n}$ & $s_d = \sqrt{\frac{\sum d^2 - n\bar{d}^2}{n-1}}$.

$$Z_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \text{ or } Z_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$T_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ where } s_p = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}}$$

$$T_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_1^2}{n_2}}} \text{ where } df = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{\left(\frac{s_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{s_2^2}{n_2}\right)^2}{n_2 - 1}}$$

$$Z_{stat} = \frac{(\hat{p}_1 - \hat{p}_2) - \pi_0}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

where $\hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$ & $\hat{p}_1 = \frac{x_1}{n_1}$ $\hat{p}_2 = \frac{x_2}{n_2}$

$$\chi^2_{stat} = \sum \frac{(f_o - f_e)^2}{f_e}, \quad df = (c-1)(r-1)$$

$$|p_i - p_j| > \sqrt{\chi^2_\alpha}\sqrt{\frac{p_i(1-p_i)}{n_i} + \frac{p_j(1-p_j)}{n_j}}$$

$r = \frac{S_{xy}}{\sqrt{S_{xx} \cdot S_{yy}}}$ where $S_{xx} = \sum(x - \bar{x})^2$

$S_{yy} = \sum(y - \bar{y})^2$ and $S_{xy} = \sum(x - \bar{x})(y - \bar{y})$

$T_{stat} = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ & $df = n - 2$

$\hat{y} = b_0 + b_1 x$ where $b_1 = \frac{Sxy}{Sxx}$ & $b_0 = \bar{y} - b_1\bar{x}$

$SST = S_{yy} = \sum y^2 - n\bar{y}^2$,

$SSR = b_1 S_{xy} = \frac{S_{xy}^2}{S_{xx}}$ & $SSE = SST - SSR$

$R^2 = \frac{SSR}{SST}$ and $R^2_{adj} = 1 - (1 - R^2)\left(\frac{n-1}{n-k-1}\right)$

And $S_\epsilon = S_{y.x} = \sqrt{\frac{SSE}{n-k-1}}$ with $S_{b_1} = \frac{S_\epsilon}{\sqrt{S_{xx}}}$

$T_{stat} = \frac{b_1 - \beta_{1_0}}{S_{b_1}}$ and $b_1 \pm t_{\frac{\alpha}{2}, df} S_{b_1}$ where df= n-k-1

$$\hat{y} \pm t_{\frac{\alpha}{2}, df} S_\epsilon \sqrt{\frac{1}{n} + \frac{(x_p - \bar{x})^2}{Sxx}} \quad \& \quad \hat{y} \pm t_{\frac{\alpha}{2}, df} S_\epsilon \sqrt{1 + \frac{1}{n} + \frac{(x_p - \bar{x})^2}{Sxx}}$$

$F_{stat} = \frac{MSR}{MSE}$ where $\begin{aligned} df_1 &= k \\ df_2 &= n - k - 1 \end{aligned}$

$SSR(X_j|\text{all other } X's) = SSR_{Full} - SSR_{(X_j)}$

$$r^2_{Y2.1} = \frac{SSR(X_j|\text{all other } X's)}{SST_{Full} - SSR_{Full} + SSR(X_j|\text{all other } X's)}$$

$F_{stat} = \frac{SSR(X_j|\text{all other } X's)}{MSE_{Full}}$ & $\begin{aligned} df_1 &= 1 \\ df_2 &= n - k - 1 \end{aligned}$

$F_{stat} = \frac{\frac{MSR_{Full} - MSR_{Others}}{m}}{MSE_{Full}}$, $\begin{aligned} df_1 &= m \\ df_2 &= n - k - 1 \end{aligned}$

$VIF_j = \frac{1}{1 - R_j^2}$ & $C_p = \frac{(1 - R_k^2)(n-T)}{1 - R_T^2} - (n - 2k - 2)$

$I_t = \frac{y_t}{y_0}$, $I_t = \frac{\sum p_t}{\sum p_0}(100)$ & $E_{t+1} = wy_t + (1 - w)E_t$

$IP_t = \frac{\sum p_t q_t}{\sum p_0 q_t}(100)$ $IL_t = \frac{\sum p_t q_0}{\sum p_0 q_0}(100)$

$y_t = \beta_0 \beta_1^{x_t} \varepsilon_t$ then

$\log(y_t) = \log(\beta_0) + x_t \log(\beta_1) + \log(\varepsilon_t)$

$y_t = \beta_0 \beta_1^{x_t} \beta_2^{Q_1} \beta_3^{Q_2} \beta_4^{Q_3} \varepsilon_t$

$y_t = A_0 + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + \varepsilon$