ST551 Final Formula Sheet

Fall 2017

Pooled variance

$$s_p^2 = \hat{\sigma}^2 = \frac{(n-1)s_Y^2 + (m-1)s_X^2}{n+m-2}$$

Estimated variance in a paired t-test

$$\widehat{Var}\left(\overline{Y} - \overline{X}\right) = \frac{s_Y^2}{n} + \frac{s_X^2}{n} - 2\frac{s_{YX}}{n}$$

Two sample proportion Z-statistic

$$Z = \frac{\hat{p}_Y - \hat{p}_X}{\sqrt{\hat{p}_c(1-\hat{p}_c)\left(\frac{1}{n} + \frac{1}{m}\right)}}$$

where $\hat{p}_c = \frac{(np_Y + mp_X)}{n+m} = \frac{b+d}{N}$

CI for median, based on Sign Test

$$\left(\left(\frac{n - z_{1-\alpha/2}\sqrt{n}}{2}\right)^{\text{th}} \text{ smallest observation},\right.$$
$$\left.\left(\frac{n + z_{1-\alpha/2}\sqrt{n}}{2} + 1\right)^{\text{th}} \text{ smallest observation}\right)$$

Welch-Satterthwaite degrees of freedom

$$v = \frac{(s_Y^2/n + s_X^2/m)^2}{\frac{s_Y^4}{n^2(n-1)} + \frac{s_X^4}{m^2(m-1)}}$$

Mantel-Haenszel test

$$X = \frac{\left(\sum_{j=1}^{k}(a_j - E(a_j))\right)^2}{\sum_{j=1}^{k} Var(a_j)}$$

$$E(a_j) = \frac{(R_{1j})(C_{1j})}{N_j}$$

$$Var(a_j) = \frac{R_{1j}C_{1j}R_{2j}C_{2j}}{N_j^2(N_j - 1)}$$