Confidence Interval Formulas

All confidence intervals are of the form

Point Estimate ± E where E = Maximal Margin of Error

Parameter	Point Estimate	E	Assumptions
μ	$\bar{x}$	$z_c\sigma_{\bar{x}}$	σ known $\bar{x}$'s normal
μ	$\bar{x}$	$t_c \cdot \frac{s}{\sqrt{n}}$ $df = n-1$	σ unknown $\bar{x}$'s normal
p	$\hat{p} = \frac{r}{n}$	$z_c\sqrt{\frac{\hat{p}\hat{q}}{n}}$	$n\hat{p} > 5$ $n\hat{q} > 5$
$\mu_1 - \mu_2$	$\bar{x}_1 - \bar{x}_2$	$z_c\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$	σ_1, σ_2 known $\bar{x}_1 - \bar{x}_2$'s normal IRS
$\mu_1 - \mu_2$	$\bar{x}_1 - \bar{x}_2$	$t_c\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$ $df = \text{MIN}(n_1 - 1, n_2 - 1)$	σ_1, σ_2 unknown and assumed unequal $\bar{x}_1 - \bar{x}_2$'s normal IRS
$\mu_1 - \mu_2$	$\bar{x}_1 - \bar{x}_2$	$t_c s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$ $s = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}}$ $df = n_1 + n_2 - 2$	σ_1, σ_2 unknown and assumed equal $\bar{x}_1 - \bar{x}_2$'s normal IRS
μ_d	$\bar{d}$	$t_c \cdot \frac{s_d}{\sqrt{n}}$ $df = n-1$	d's normal DRS
$p_1 - p_2$	$\hat{p}_1 - \hat{p}_2$	$z_c\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$	$n_1\hat{p}_1 > 5$ $n_1\hat{q}_1 > 5$ $n_2\hat{p}_2 > 5$ $n_2\hat{q}_2 > 5$