Hypothesis testing - two samples

distribution	hypothesis: H - null	hypothesis: A - alternative	test statistic	critical region W_α	note
	$\sigma_1^2 = \sigma_2^2$	$\sigma_1^2 \neq \sigma_2^2$ $\sigma_1^2 > \sigma_2^2$ $\sigma_1^2 < \sigma_2^2$	$F = \frac{s_1^2}{s_2^2}$	$F \le F_{\alpha/2}(\nu_1,\nu_2) \vee F \ge F_{1-\alpha/2}(\nu_1,\nu_2)$ $F \ge F_{1-\alpha}(\nu_1,\nu_2)$ $F \le F_{\alpha}(\nu_1,\nu_2)$	$\nu_1 = n_1 - 1,\ \nu_2 = n_2 - 1$ for $P < 0.5$: $F_P(\nu_1,\nu_2) = \frac{1}{F_{1-P}(\nu_2,\nu_1)}$
$X ... N(\mu_1, \sigma_1^2)$ $Y ... N(\mu_2, \sigma_2^2)$ independent	$\mu_1 = \mu_2$ on condition $\sigma_1^2 = \sigma_2^2$	$\mu_1 \neq \mu_2$ $\mu_1 > \mu_2$ $\mu_1 < \mu_2$	$t = \frac{\overline{x} - \overline{y}}{S} \sqrt{\frac{n_1 \cdot n_2}{n_1 + n_2}}$	$\lvert t \rvert \ge t_{1-\alpha/2}(\nu)$ $t \ge t_{1-\alpha}(\nu)$ $t \le -t_{1-\alpha}(\nu)$	$\nu = n_1 + n_2 - 2$ $S = \left[\frac{(n_1 - 1)\cdot s_1^2 + (n_2 - 1)\cdot s_2^2}{n_1 + n_2 - 2}\right]^{\frac{1}{2}}$
	$\mu_1 = \mu_2$ on condition $\sigma_1^2 \neq \sigma_2^2$	$\mu_1 \neq \mu_2$ $\mu_1 > \mu_2$ $\mu_1 < \mu_2$	$t = \frac{\overline{x} - \overline{y}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$	$\lvert t \rvert \ge t_{1-\alpha/2}(\nu)$ $t \ge t_{1-\alpha}(\nu)$ $t \le -t_{1-\alpha}(\nu)$	$\nu \approx \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{1}{n_1 - 1}\left(\frac{s_1^2}{n_1}\right)^2 + \frac{1}{n_2 - 1}\left(\frac{s_2^2}{n_2}\right)^2}$
X…any Y…any independent	$\mu_1 = \mu_2$	$\mu_1 \neq \mu_2$ $\mu_1 > \mu_2$ $\mu_1 < \mu_2$	$u = \frac{\overline{x} - \overline{y}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$	$\lvert u \rvert \ge u_{1-\alpha/2}$ $u \ge u_{1-\alpha}$ $u \le -u_{1-\alpha}$	for n_1, n_2 large enough
$X ... N(\mu_1, \sigma_1^2)$ $Y ... N(\mu_2, \sigma_2^2)$ dependent	$\mu_1 = \mu_2$	$\mu_1 \neq \mu_2$ $\mu_1 > \mu_2$ $\mu_1 < \mu_2$	$t = \frac{\overline{d}}{s_d} \cdot \sqrt{n}$	$\lvert t \rvert \ge t_{1-\alpha/2}(\nu)$ $t \ge t_{1-\alpha}(\nu)$ $t \le -t_{1-\alpha}(\nu)$	$\nu = n - 1$, pro $\nu > 30$: $t_P(\nu) \approx u_P$ $d_i = x_i - y_i$ $\overline{d}$ ... mean of differencies d_i s_d ... their standard deviation
$X…A(\pi_1)$ $Y…A(\pi_2)$ independent	$\pi_1 = \pi_2$	$\pi_1 \neq \pi_2$ $\pi_1 > \pi_2$ $\pi_1 < \pi_2$	$u = \frac{p_1 - p_2}{\sqrt{\frac{p_1(1 - p_1)}{n_1} + \frac{p_2(1 - p_2)}{n_2}}}$	$\lvert u \rvert \ge u_{1-\alpha/2}$ $u \ge u_{1-\alpha}$ $u \le -u_{1-\alpha}$	for n_1, n_2 large enough pro $n_1 p_1(1 - p_1) > 9$ a $n_2 p_2(1 - p_2) > 9$