Ch # 10
Hypothesis testing

$\bar{x}$ = Mean of sample | S = sample std
μ = Mean of pop | σ = pop std.

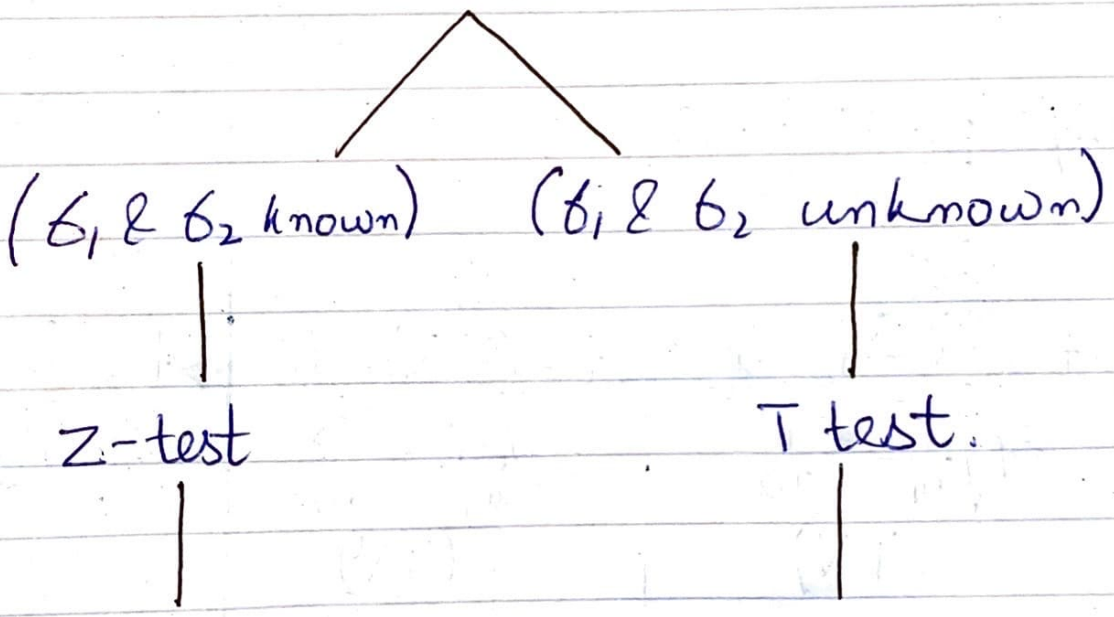
Z test	T-test
• pop std (σ) known • $n \geq 30$	Vice versa. If σ in unknown and $n < 30$

- Null (H_0)
- Alternate (H_1).

→ If T.V lies outside critical region dont reject H_0.

→ If TV lies inside CR reject it.

Two cases of testing (two means)



$$z = \frac{(\bar{X}_1 - \bar{X}_2) - d_0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma^2}{n_2}}}$$

3 types.

where
d_0 is Null hypothesic value ($H_0 : \mu_2 - \mu_1 = 0$)

d_0

T-test

pooled

- $\frac{S_1}{S_2}$ or $\frac{S_2}{S_1}$ b/w 1-2

→ $\nu = n_1 + n_2 - 2$

→ $s_p^2 = \frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{\nu}$

$(\bar{X}_1 - \bar{X}_2)$ or $(\bar{X}_2 - \bar{X}_1)$

→ $t = \frac{(\bar{X}_2 - \bar{X}_1) - d_0}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$

(TV)

→ $t_{\alpha,\nu} = CV$

→ Result

non pooled

- $\frac{S_1}{S_2}$ or $\frac{S_2}{S_1}$ > 3

→ $\nu = \frac{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}{\frac{\left(\frac{S_1^2}{n_1}\right)^2}{n_1-1} + \frac{\left(\frac{S_2^2}{n_2}\right)^2}{n_2-1}}$

$(\bar{X}_1 - \bar{X}_2)$ or $(\bar{X}_2 - \bar{X}_1)$

→ $t = \frac{(\bar{X}_2 - \bar{X}_1) - d_0}{\sqrt{\frac{S_1^2}{n_1} - \frac{S_2^2}{n_2}}}$

(TV)

→ $t_{\alpha,\nu} = CV$

Result

pared

- dependent

→ $\nu = n - 1$

→ $\bar{d}$ = mean

→ S_d = std deviation

→ $t = \frac{\bar{d} - d_0}{S_d/\sqrt{n}}$

(TV)

→ $t_{\alpha,\nu} = CV$.

Result.