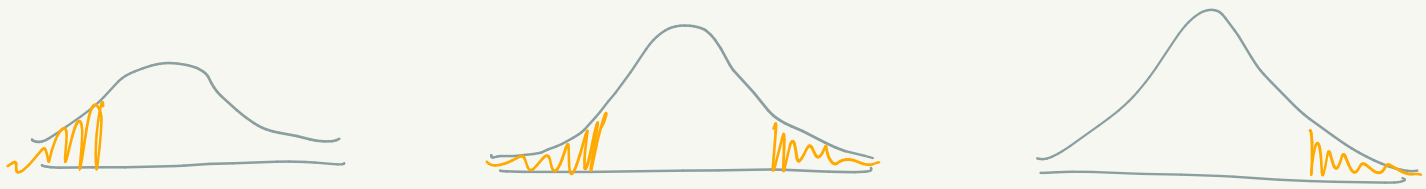
EXAM REVIEW Ch10 & Ch11

Ch10 10.1 Logic of Hypothesis Test.

$\begin{cases} H_0: \text{"no change" or "all equal"} \\ H_A: \text{"some statement differing from } H_0\text{"} \end{cases}$

3 Types of Tests (depend on H_A chosen)



LTT TTT RTT

TWO METHODS
- p-Value Method
- Critical Value Method

TYPES OF DISTRIBUTIONS

z-distribution (standard normal $\mu=0$ & $\sigma=1$) ↓ Used w/ proportions

&

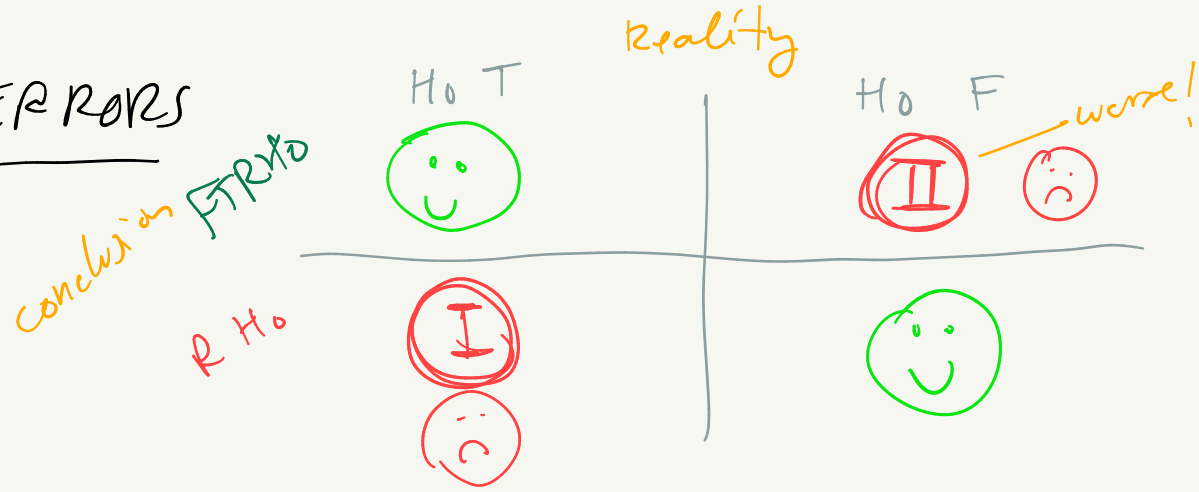
t-distribution ↓ Used w/ means

CONCLUSIONS

Fail to Reject H_0 ("keep H_0")

Reject H_0 ("support H_A")

TYPES OF ERRORS



Level of Significance $\alpha = P(\text{Type I Error})$

$\beta = P(\text{Type II Error})$

- α & β are inversely related
  - ↳ if α is decreased, then β is increased

10.2 One Proportion (p)

$$\begin{cases} H_0: p = p_0 \\ H_A: p \begin{cases} < \\ \neq \\ > \end{cases} p_0 \end{cases}$$

now / past

Test Stat $z^* = \dfrac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$

- z-distribution

Calculator: 1-PropZTest

10.3 One Mean (μ)

$$\begin{cases} H_0: \mu = \mu_0 \\ H_A: \mu \begin{cases} < \\ \neq \\ > \end{cases} \mu_0 \end{cases}$$

now / past

Test Stat $t^* = \dfrac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$

- t-distribution

Calculator: T-Test

Ch 11 Two Parameter Inference (HT & CI)

11.1 Two Proportions (Independent) (p_1, p_2)

HT

$$\begin{cases} H_0: p_1 = p_2 \\ H_A: p_1 \begin{cases} < \\ \neq \\ > \end{cases} p_2 \end{cases}$$

Test Stat

$$z^* = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\bar{p}\bar{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$\bar{p} = \dfrac{x_1 + x_2}{n_1 + n_2}$, $\bar{q} = 1 - \bar{p}$

- z-dist

Calculator: 2PropZTest

CI

point 1st parameter: $-E$ / $+E$

point estimate: $\hat{p}_1 - \hat{p}_2$

CI: $\left((\hat{p}_1 - \hat{p}_2) - E, (\hat{p}_1 - \hat{p}_2) + E\right)$

$E = z_{\alpha/2}\sqrt{\dfrac{\hat{p}_1\hat{q}_1}{n_1} + \dfrac{\hat{p}_2\hat{q}_2}{n_2}}$

Calc: 2PropZInt

(proportion from step 1)

11.2 Two Means (Dependent) Matched Pairs $(\mu_1 - \mu_2 = \mu_d)$

HT

$H_0: \mu_d = 0$

$H_A: \mu_d \{<, \neq, >\} 0$

d = differences $= x_1 - x_2$

$= x - y$

Test Stat $t^* = \dfrac{\bar{d} - \mu_d}{\frac{s_d}{\sqrt{n}}}$

- t-dist

Calculator

T-Test

CI

point estimate: $\bar{d}$

$CI: \left(\bar{d} - E, \bar{d} + E\right)$

$E = t_{\alpha/2}\sqrt{\dfrac{s_d}{n}}$

Calculator

TInterval

11.3 Two Means (Independent) $(\mu_1, \mu_2, \mu_1 - \mu_2)$

HT

$H_0: \mu_1 = \mu_2$

$H_A: \mu_1 \{<, \neq, >\} \mu_2$

Test Stat $t^* = \dfrac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$

- t-dist

Calculator

2SampTTest

CI

point estimate: $\bar{x}_1 - \bar{x}_2$

$CI: \left((\bar{x}_1 - \bar{x}_2) - E, (\bar{x}_1 - \bar{x}_2) + E\right)$

$E = t_{\alpha/2}\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}$

Calc

2SampTInt