

→ Confusion matrix in hypothesis testing

		Actual values	
		H_0	H_a
Predicted values	Fail to reject H_0	Confidence $(1-\alpha)$ ●	Type II error (β) ●
	Reject H_0	Type I error (α) ●	Power of Test $(1-\beta)$ ●

- Wrong decision
- correct decision

$$\text{Accuracy} = \frac{\text{Correct predictions}}{\text{Total predictions}}$$

- Confidence $(1-\alpha=CI)$ is probability of accepting True Null Hypothesis.
 - Power of Test $(1-\beta)$ is probability of rejecting False Null Hypothesis.
 - Type I error occurs when we reject (α) true Null Hypothesis.
 - Type II error occurs when we accept False Null Hypothesis.
- Confidence \propto Power of Test

→ Point Estimate (PE)

- The value of any statistics that estimates the value of a parameter
- It is basically test statistic (\pm) .

$$PE \pm \text{Margin Error} = \text{Parameter}$$

$$C_{\text{lower}} = PE - \text{Margin Error}$$

$$C_{\text{upper}} = PE + \text{Margin Error}$$

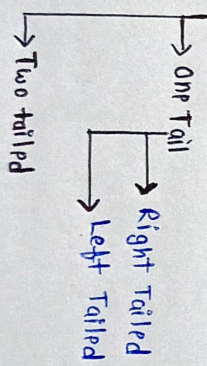
$$\text{Margin Error} = Z_{\alpha/2} \left(\frac{\sigma}{\sqrt{n}} \right)$$

(Standard error)

- $\frac{\sigma}{\sqrt{n}}$ is population standard deviation
- ex- Sample mean (\bar{x}) can be used to estimate population mean (μ) .

Statistic $\leftarrow \bar{x} \xrightarrow{\text{estimate}} (\mu) \xrightarrow{\text{parameter}}$

- Based on distribution hypothesis testing can be performed at various ends of distribution to find H_0 acceptance or rejection.



→ Test statistics

Hypothesis Test	Test statistics
Z-Test	Z-Score
T-Test	T-Score
F-Test	F-statistic
chi-square Test	chi-square statistic

- Z, T test are done on normally distributed data.
- Chi-square test done on chi-squared distributed data.
- F-Test done on f distributed data.
- Anova test is variation of F-test.