(1)

Q Define level of significance. (LOS)

Ans The Level of significance is the maximum probability of making a type-I error. which is denoted by α. It is already discussed. Commonly LOS for practice 5% and 1% used.

Q Define Standard error (S.E)

The standard deviation of the sampling distribution of a statistic is known as standard error.

It's short form is S.E.

The S.E. plays very important role in the Large sample theory and forms the basis of the testing of hypothesis.

If 't' is any statistic, for large sample

Priorities

(2)

$$Z = \frac{t - E(t)}{S.E.(t)}$$ is normally distributed with $N(0,1)$.

Remark: The critical value or significant value depends upon

(1) level of significance used (LOS)

(2) Alternative hypothesis (H_1) whether it is two tailed or single tailed.

for large sample, the standardized variable

$$Z = \frac{t - E(t)}{S.E.(t)} \sim N(0,1)$$

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The value of Z under null hypothesis is known as test statistic.

(3)

The critical value at LOS 'α' for two-tailed test is given by "Z_α"
It is determined by the eqn,

$$P(|Z| > Z_\alpha) = \alpha$$

i.e. $P(Z < Z_\alpha) = \alpha$ and $P(Z < -Z_\alpha) = \alpha$.

Type of test :-

① Two tailed Test :-

When the test of hypothesis is made on the basis of rejection region represented by both sides of the standard normal curve. is called two tailed test

It is also called two sided test

(4)

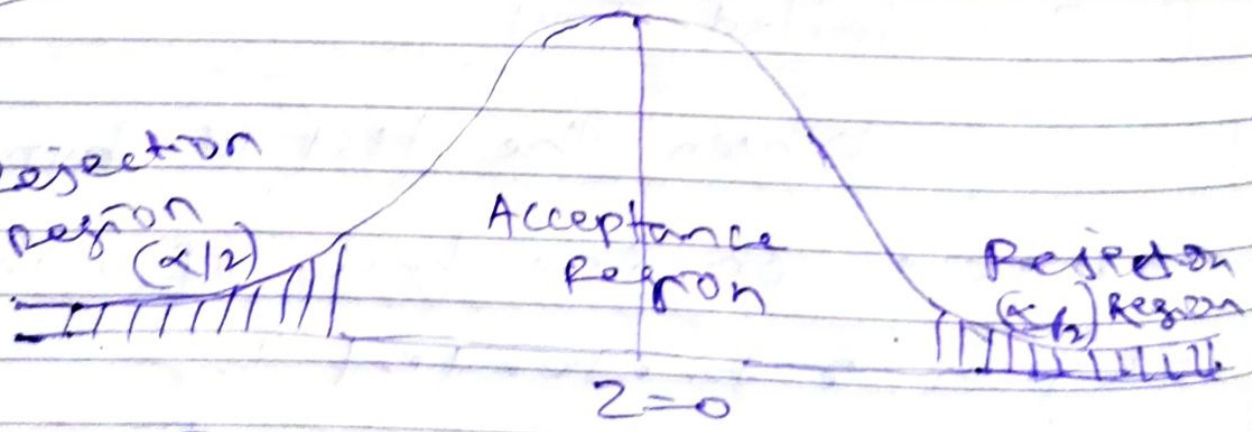
In other words, a test of statistical hypothesis where the alternative hypothesis (H_1) is ~~two sided~~ two sided. Then it is called two tailed test

~~Null~~ hypothesis $H_0: \mu = \mu_0$

Alternative hypothesis $H_1: \mu \neq \mu_0$

($\mu > \mu_0$ and $\mu < \mu_0$)

$P(|Z| > Z_\alpha) = \alpha$



Two tailed test at significal level.

(11) One tailed test :-

A test of statistical hypothesis, where the alternative

Priorities

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hypothesis is one sided is called one tailed test.

It is also called one sided test. or single tailed Test.

O.T.T (One Tailed Test)

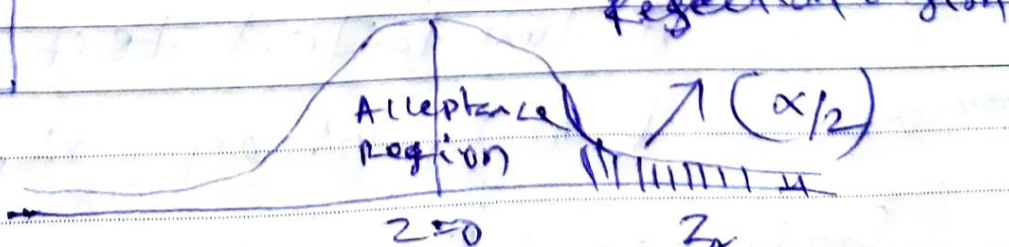
R.T.T (Right Tailed Test)

L.T.T (Left Tailed Test)

Right Tailed test (R.T.T)

In the right tailed test the rejection region or critical region lies entirely on the right tail of the normal curve.

$P(Z \geq Z_\alpha) = \alpha$



Right tailed test at significance level.

(b)

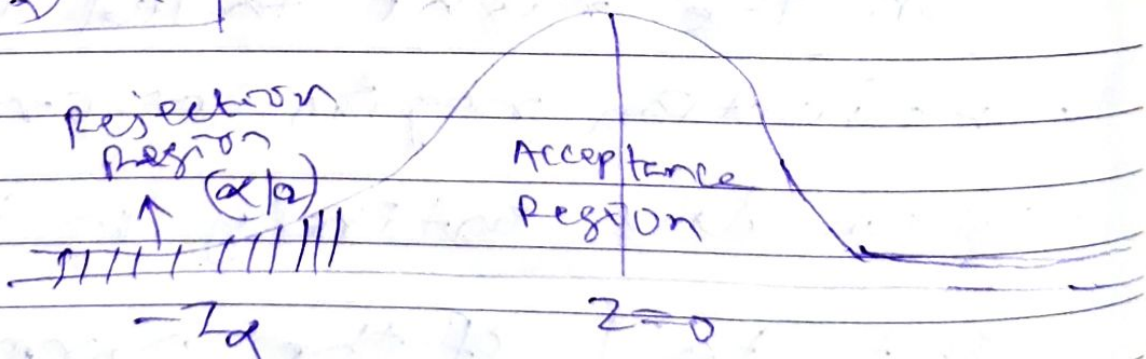
Null Hypothesis (H_0) : $\mu = \mu_0$

Alternative hypothesis (H_1) : $\mu > \mu_0$.

Left tailed Test (L.T.T)

In the left tailed test the rejection region or critical region lies entirely on left tail of the normal curve.

$$P(Z < -Z_\alpha) = \alpha$$



Note :- (1) A two tailed test is applied only when the difference between sample mean and

population mean is tendency to reject the null hypothesis (H_0).
The difference may be +ve or -ve.

(4) One tailed test is applied only when
ie the population mean is at least as large as some specified value of the mean.
we apply (R.T.T).

when the population mean is at least as small as some specified value of the mean.
we apply (L.T.T).

Table for critical value (Z_α) of z

C.V(Z_α)	1·1.	5·1.	10·1.
Two tailed Test	$\|Z_\alpha\| = 2.58$	$\|Z_\alpha\| = 1.96$	$\|Z_\alpha\| = 1.645$
Right tailed test	$Z_\alpha = 2.33$	$Z_\alpha = 1.645$	$Z_\alpha = 1.28$
Left tailed test	$Z_\alpha = -2.33$	$Z_\alpha = -1.645$	$Z_\alpha = -1.28$

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Remark: When the sample size ($n \geq 30$) we use above table. When n is small i.e (< 30) we use the significant values based on the exact sampling distribution of χ^2.

Procedure for Testing of Hypothesis

Step-I: Set up the Null hypothesis (H_0)

Step-II: Set up Alternative hypothesis (H_1) this gives us to decide whether we have to use single tailed test (Right or left) or Two-tailed test

29 Sunday **Step-III**: LOS i.e choose the level of significance (α) depending on the reliability of the estimate and permissible risk

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This is to be decided before Sample drawn.

i.e. α is fixed in advance

Step-(IV): Determine the test statistic

$$Z = \frac{t - E(t)}{SE(t)}$$ under the null hypothesis. It is also called test criterion.

Step-(V) :- Compare the evaluated value of Z in previous step with significant value Z_α at given LOS (α).

(I) If $|Z| < Z_\alpha$ then we accept H_0

The difference $[t - E(t)]$ is not significant, so we accept H_0.

In this case the test statistic falls in the region of acceptance

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(10)

(11) If $|t| > z_\alpha$ then we reject the null hypothesis (H_0) and accept alternative hypothesis (H_1).

In this case the test statistic falls in the rejection region.

∴ we reject (H_0) and accept (H_1) at LOS (α) or Confidence level ($1-\alpha$)