



DEPARTMENT OF MATHEMATICS

UNIT- IV TESTING OF HYPOTHESIS

TESTING OF HYPOTHESIS

BASIC DEFINITIONS :

Population :-

A population is used to refer any collection of individual it may be finite or infinite .

Sample :-

A sample is a small portion ^(or drawn) selected from the population and the process of drawing a sample from a population is called sampling .

Sample size :-

The no. of individual in a selected sample is called the sample size .

parameter and statistics :-

Any statistical method computed from population data is known as parameter and Any statistical method computed from sample data is known as statistics .



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NOTATIONS :-

MEASURE		POPULATION		SAMPLE
Size	→	N	→	n
Mean	→	μ	→	\bar{x}
Standard deviation	→	σ	→	s
Proportion	→	P	→	P'
Variance	→	σ^2	→	s^2

Sampling Distribution :-

The various values of statistics so obtained may be arranged as a frequency distribution which is known as sampling distributions.

Standard Error :-

The standard deviation of sampling distribution of a statistic is known as its standard error, abbreviated as S.E. (i.e. avg. amount of variability from the observation of a sampling distribution).



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Statistical Hypothesis :-

In attempting to reach decision about population on the basis of sample observations, we make assumptions about population, which are not necessarily true, are called statistical hypothesis.

Null Hypothesis :-

Null hypothesis is the hypothesis which is tested for possible rejection under the assumption that it is true and is denoted by H_0 .
[(i) hypothesis of no difference].

Alternative hypothesis :-

A hypothesis that is complementary to null hypothesis is called alternative hypothesis and is denoted by H_1 .

A procedure for ~~designing~~ ^{deciding} whether to accept or reject the null hypothesis is called the test of hypothesis.

Level of significance :-

It is the probability level below which the null hypothesis is rejected. Generally 5% and 1% level of significance are used.



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Critical region (or) Region of rejection :-

The critical region of a test of statistical hypothesis is that region of the sample space which corresponds to the rejection of null hypothesis, H_0 . Those region which lead to the acceptance of H_0 is called acceptance region.

Error in sampling :-

Errors are Type I, Type II errors.

Type I error: Reject H_0 when it is true.

Type II error: Accept H_0 when it is false.

$$P(\text{Type I error}) = \alpha \text{ \& } P(\text{Type II error}) = \beta.$$

One tail & two tail test :-

If μ_0 is population parameter & μ is the sample statistics, then the null hypothesis is given by $H_0: \mu = \mu_0$

Alternative hypothesis is given by,

$$H_1: \mu \neq \mu_0 \text{ (two-tailed)}$$

$$H_1: \mu > \mu_0 \text{ (Right tailed) (one tail)}$$

$$H_1: \mu < \mu_0 \text{ (Left tailed) (")}$$

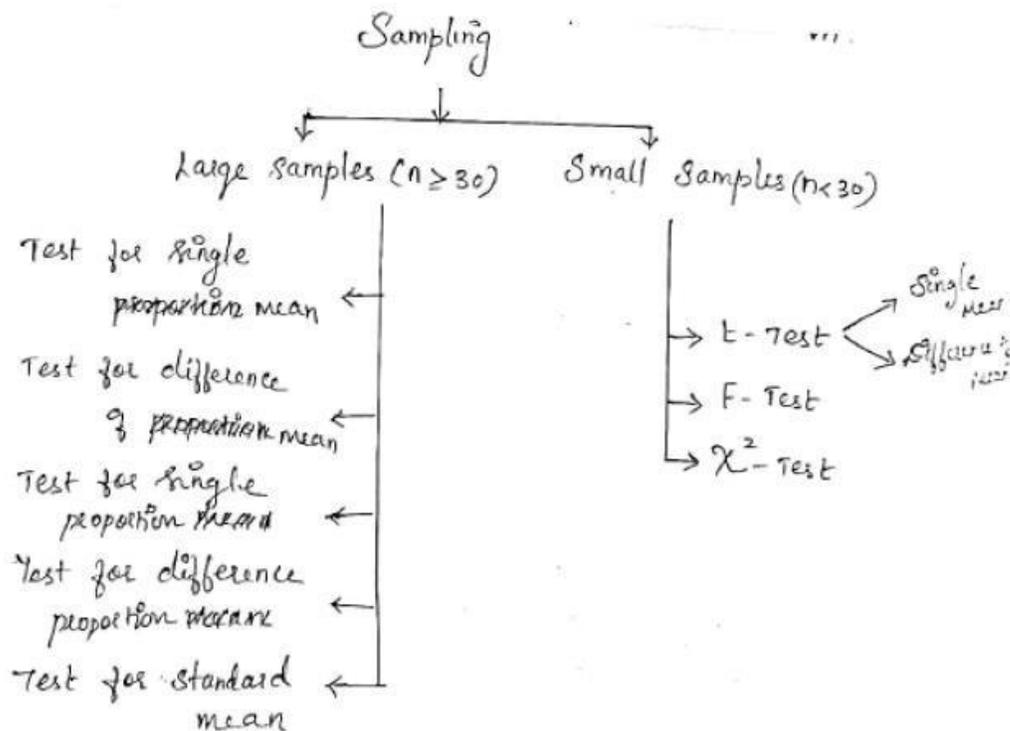


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PROCEDURE FOR TESTING A HYPOTHESIS :-

- 1) Formulate H_0 and H_1
- 2) Choose the level of significance α
- 3) compute the test statistic, using the data available.
- 4) pick out the critical value from the tabulation
- 5) Conclusion: compare the computed value of the test statistic with the critical value at the given level of significance.





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Large samples ($n \geq 30$)

Critical values (or) significant values:-

The sample values of the statistic beyond which the null hypothesis will be rejected are called critical values or significant values.

Nature of test	Level of significance		
	1%	5%	10%
Two tailed test (z_c):	2.58	1.96	1.645
One tailed test (z_c):	2.33	1.645	1.28 (right)
	-2.33	-1.645	-1.28 (left)