Glossary

1. Alternative Hypothesis

The alternative hypothesis, H_1 , is a statement of what a statistical hypothesis test is set up to establish. For example, in a clinical trial of a new drug, the alternative hypothesis might be that the new drug has a different effect, on average, compared to that of the current drug.

2. Composite hypothesis

A composite hypothesis is a hypothesis which does not specify the population distribution completely.

3. Critical region

The critical region CR, or rejection region RR, is a set of values of the test statistic for which the null hypothesis is rejected in a hypothesis test. That is, the sample space for the test statistic is partitioned into two regions; one region (the critical region) will lead us to reject the null hypothesis H₀, the other will not. So, if the observed value of the test statistic is a member of the critical region, we conclude "Reject H₀"; if it is not a member of the critical region then we conclude "Do not reject H₀".

4. Joint Density Function

A function of two or more random variables from which can be obtained a single probability that all the variables in the function will take specified values or fall within specified intervals.

5. Lemma

Lemma is a proven statement used as a stepping-stone toward the proof of another statement.

6. Likelihood Function

In statistics, a likelihood function (often simply the likelihood) is a function of the parameters of a statistical model, defined as follows: the likelihood of a set of parameter values given some observed outcomes is equal to the probability of those observed outcomes given those parameter values.

7. Likelihood Ratio Test

A likelihood ratio test is a statistical test used to compare the fit of two models, one of which (the null model) is a special case of the other (the alternative model).

8. Maximum Likelihood Estimation

In statistics, maximum-likelihood estimation (MLE) is a method of estimating the parameters of a statistical model. When applied to a data set and given a statistical model, maximum-likelihood estimation provides estimates for the model's parameters.

9. Most Powerful Critical Region

Among the critical regions of the same size α that which renders the minimum Type two error is called the most powerful critical region.

10. Most Powerful test

Most Powerful test is the test procedure used to test the simple null hypothesis against a simple alternative hypothesis.

11. Null Hypothesis

The null hypothesis, H_0 , represents a theory that has been put forward, either because it is believed to be true or because it is to be used as a basis for argument, but has not been proved. For example, in a clinical trial of a new drug, the null hypothesis might be that the new drug is no better, on average, than the current drug.

12. Power

The power of a statistical hypothesis test measures the test's ability to reject the null hypothesis when it is actually false - that is, to make a correct decision. In other words, the power of a hypothesis test is the probability of not committing a type II error. It is calculated by subtracting the probability of a type II error from 1, usually expressed as:

Power = 1 - P (type II error) =(1- β)

13. Simple hypothesis

A simple hypothesis is a hypothesis which specifies the population distribution.

14. Supremum

The supremum (sup) of a subset S of a totally or partially ordered set T is the least element of T that is greater than or equal to all elements of S. Consequently, the supremum is also referred to as the least upper bound (lub or LUB).

15. Uniformly Most Powerful Test

Uniformly most powerful (UMP) test is a hypothesis test which has the greatest power

 $1-\beta$ among all possible tests of a given size α