<u>Glossary</u>

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 Value

The critical value in a hypothesis test is the value of the test statistic beyond which we would reject the null hypothesis. The critical value is set so that the probability that the test statistic is beyond the critical value is at most equal to the significance level if the null hypothesis be true.

4. 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.

5. 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.

6. 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) = $(1-\beta)$

7. Powerful Test

The test based on the most powerful critical region is called the most powerful test.

8. Significance Level

The significance level of a statistical hypothesis test is a fixed probability of wrongly rejecting the null hypothesis H_0 , if it is in fact true.

9. Simple hypothesis

A simple hypothesis is a hypothesis which specifies the population distribution

10. Statistical Hypothesis

A statistical hypothesis test is a method of making decisions using data, whether from a controlled experiment or an observational study (not controlled). In statistics, a result is called statistically significant if it is unlikely to have occurred by chance alone, according to a pre-determined threshold probability, the significance level.

11. Type I Error

In a hypothesis test, a type I error occurs when the null hypothesis is rejected when it is in fact true; that is, H_0 is wrongly rejected.

12. Type II Error

In a hypothesis test, a type II error occurs when the null hypothesis H_0 , is not rejected when it is in fact false.

13. Unbiased Critical Region

A critical region whose power is more than its size is called unbiased critical region.

14. Unbiased test

The test procedure for which the power is more than its size is called an unbiased test.

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