

Unit 6 *Hypothesis Testing*

Introduction

Learning objectives

This is a very important aspect of Statistics as we are attempting to see 'if the evidence is strong enough to reject or accept an alternative hypothesis'. After studying this unit you should

- appreciate how to set up null and alternative hypotheses
- understand the steps to be taken in any hypothesis testing
- use the sign test to find out whether or not significant progress has been made in an activity.

Notes

This unit covers the basic methodology in hypothesis testing but uses it in only a limited number of specific tests; the concept has many more applications, across a range of contexts.

Key points

- In any hypothesis test you must follow the steps:
 1. Specify the null hypothesis, H_0
 2. Decide on the alternative hypothesis, H_1
 3. State the significance level
 4. Assume that H_0 is true
 5. State the distribution that follows and calculate the expected probabilities for outcomes
 6. Use the experimental data to either provide significant evidence to reject H_0 and accept H_1 , or to confirm that there is not sufficient evidence to reject H_0 .
- The significance level gives the probability of making the wrong conclusion, e.g. 5% significance level means that wrong conclusions would be made 1 in 20 times.

Glossary of terms

Null hypothesis: the underlying hypothesis that you would expect (e.g. the 'status quo')

Alternative hypothesis: the hypothesis indicated by your experimental data

Significance level: the accepted probability for making the wrong conclusion (for example, a 5% significance level means you will be wrong 5%, or 1 in 20, of the time)

Sign test: used to make conclusions as to whether practice at a particular activity has resulted in improvement.