



MATH38021 - 2007/2008

General Information

- Title: Non-Parametric Statistics
- Unit code: MATH38021
- Credits: 10
- Prerequisites: MATH10401, MATH20701, MATH20802
- Co-requisite units: None
- School responsible: Mathematics
- Members of staff responsible: Dr. [Peter Foster](#)

Specification

Aims

This course unit aims to familiarise students with a number of nonparametric statistical techniques both in terms of the methodology, the underlying theory and some practical implementation using S-Plus.

Brief Description of the unit

In classical statistical inference fairly specific assumptions are made about the nature of the underlying population distribution - usually its parametric form, with the parameters either assumed to be known or estimated from the data (e.g. the mean and variance of the Normal distribution). Mathematical techniques are then used to develop methods to make the required inferences but all conclusions reached in this way will only be valid so long as the assumptions themselves were appropriate. In many cases though the investigator does not know the form of the underlying distribution. In this course unit we introduce a number of estimative techniques and hypothesis testing procedures where the null distribution of the test statistic does not depend on the particular underlying distribution.

Learning Outcomes

On successful completion of this course unit students will

- have an awareness of the need for nonparametric statistical techniques as alternatives to parametric methods;
- have acquired skills, including the use of the statistical package S-Plus, in their practical implementation;
- have an understanding of the underlying theory.

Future topics requiring this course unit

It forms a useful background to other third and fourth year statistics course units.

Syllabus

1. Introduction and basic ideas.
2. Order statistics and their statistical application.
3. Single sample procedures.
4. Bivariate data, including measuring association between variables.
5. Two or more independent samples.
6. Nonparametric linear regression.

Textbooks

- W.J. Conover, *Practical Nonparametric Statistics*, Third Edition (Wiley).
- Myles Hollander and Douglas A. Wolfe, *Nonparametric Statistical Methods*, Second Edition, Wiley, New York 1999.

- Gibbons and Chakraborti, *Nonparametric Statistical Inference*, Fourth Edition 2003.

Teaching and learning methods

Two lectures and one examples class each week. In addition students should expect to spend at least four hours each week on private study for this course unit.

Assessment

Coursework: 20%

End of semester examination: two hours weighting 80%

Arrangements