

On-line course materials

MATH48091 - Statistical Computing

Year: 4 - Semester: 1 - Credit Rating: 15

Requisites

Prerequisites

MATH20701 Probability 2

Aims

To introduce the student to computational statistics, both the underlying theory and the practical applications.

Brief Description

Computers are an invaluable tool to modern statisticians. The increasing power of computers has greatly increased the scope of inferential methods and the type of models which can be analysed. This has led to the development of a number of computationally intensive statistical methods, many of which will be introduced in this course.

Learning Outcomes

On successful completion of this course unit students will be able to

- appreciate the usefulness of computational methods in modern statistics;
- understand the basic ideas underpinning the theory;
- be able to apply the methodology to standard problems.

Syllabus

- Simulating random variables: inversion, rejection, ratio of uniforms, transformations. [4]
- Monte Carlo integration: introduction, importance sampling, antithetic variables, control variates. [4]
- Kernel density estimation. [2]
- Non-parametric Bootstrap and Jackknife. [3]
- Nonlinear regression: model specification, least squares estimation, Gauss-Newton algorithm. [3]
- EM algorithm: Data augmentation, mixture distributions, censored data, standard errors, Monte-Carlo EM. [6]

Teaching & Learning Process (Hours Allocated To)

Lectures	Tutorials/ Example Classes	Practical Work/ Laboratory	Private Study	Total
22	0	22	106	150

Assessment and Feedback

- ten pieces of coursework : 50%
- End of semester written examination (2 hours): 50%

Further Reading

Rizzo, M. L., Statistical Computing with R. Chapman & Hall

Staff Involved

Dr Peter Foster - Lecturer

Data source is EPS system

Back To Top