SYLLABUS DEL CORSO

Statistica Computazionale

2223-1-F8204B004-F8204B007M

Learning objectives

This course provides an introduction to the most important computational statistical methods. Students will be introduced to the use of R for the implementation of the computational methods shown during the course.

Contents

We will cover the basic principles of the Monte Carlo method, the theoretical basis of the random numbers generators as well as the fundamental concepts of resampling techniques as we discuss bootstrap and jackknife. Algorithms for iterative maximum likelihood estimation are introduced in certain examples.

Detailed program

- Random numbers generation for uniform, non-uniform, discrete and continuous distributions
- Introduction to Monte Carlo simulation and Monte Carlo Integration
- Variance reduction techniques
- Resampling Techniques: bootstrap and jackknife
- Bootstrap confidence intervals
- Bootstrap Hypothesis Testing
- Numerical and graphical aspects for likelihood inference

Prerequisites

At least BSc courses on probability calculus, statistical inference, basic programming skills with R.

Teaching methods

- Lectures
- Tutorial sessions in computer laboratory

Assessment methods

Written and a computer-based exam using the [Piattaforma Esami Informatizzat](#) platform.

Textbooks and Reading Materials

- Lecture notes provided by the instructor
- Robert, C.P. e Casella, G. (2009), Introducing Monte Carlo Methods with R, New York: Springer-Verlag
- Davison and Hinkley (1997). Bootstrap Methods and their Applications, Chapman and Hall.

Semester

Second semester.

Teaching language

Italian.

Sustainable Development Goals

QUALITY EDUCATION