Simulation and Resampling

Academic Year: (2021 / 2022) **Review date: 20-05-2021**

Department assigned to the subject: Statistics Department

Coordinating teacher: CASCOS FERNANDEZ, IGNACIO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Probability
Statistical Inference

OBJECTIVES

Knowledge acquisition of: 1) random variables, elementary probability and distributions; 2) relevant probabilistic inequalities; 3) random vectors, marginal and joint distributions; 4) sequences of random variables and concepts of convergences; 5) Markov chains; 6) Poisson processes; 7) processes in continuous time; 8) univariate and multivariate simulation methods; 9) non-parametric and parametric resampling methods.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to Monte Carlo techniques
2. Simulating random variables and vectos
3. Discrete event simulation
4. Variance reduction and MCMC
5. Introduction to the bootstrap
6. Bootstrap for two samples and complicated data structures
7. Bootstrap-based inference

ASSESSMENT SYSTEM

SE2 Group or individual take-home asignments: 100%

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Bradley Efron, Robert Tibshirani An Introduction to Bootstrap, Chapman & Hall, 1998

- Sheldon Ross Simulation, Academic Press, 2013

ADDITIONAL BIBLIOGRAPHY

- Ralf Korn, Elke Korn, Gerald Kroisandt Monte Carlo Methods and Models in Finance and Insurance, Chapmann & Hall/CRC, 2010