Resambling Techniques

Academic Year: (2023 / 2024)   **Review date: 26-04-2023**

Department assigned to the subject: Statistics Department

Coordinating teacher: MARIN DIAZARAQUE, JUAN MIGUEL

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)
Probability I
Probability II
Técnicas de Inferencia Estadística I
Técnicas de Inferencia Estadística II
Métodos de Regresión

OBJECTIVES
General objectives:
1. Capacity for analysis and synthesis.
2. To model and solve problems.
3. Oral and written communication skills.

Specific objectives:
1. To know the basic techniques of resampling methods
2. To know and use statistical software to work with resampling techniques.

DESCRIPTION OF CONTENTS: PROGRAMME
1 Introduction to resampling methods: bootstrap and permutations
1.1 Examples of classical estimation problems
1.2 Applications with R

2. Jackcnife methods and permutation tests
2.1 Properties of jacknife estimators and permutation tests
3.2 Applications with R

3 Concepts related to empirical distribution
3.1 Estimation of standard errors through resampling.
3.2 Estimation of biases through resampling

4 Linear models and time series with resampling
4.1 Bootstrap regression models
4.2 Time series models with bootstrap
4.3 Applications with R

5 Confidence intervals based on resampling
5.1 Justification of alternatives in bootstrap confidence intervals
5.2 Applications with R

6 Hypothesis tests based on resampling
6.1 Bootstrap tests
6.2 Applications with R

LEARNING ACTIVITIES AND METHODOLOGY
Theory (4 ECTS). Theoretical classes with support material available on the Web. Practice (2 ECTS) problem-solving classes. Computing practices in computer labs. Presentations and debates.

ASSESSMENT SYSTEM
Midterm Exam (30%)
Exercises and practices (70%)

% end-of-term-examination: 30

% of continuous assessment (assigments, laboratory, practicals…):   70

BASIC BIBLIOGRAPHY
- A.C. Davison, D.V. Hinkley Bootstrap Methods and their Applications, Cambridge University Press., (1997)

- B. Efron, R. Tibshirani An Introduction to the bootstrap, Chapman and Hall., (1993)

- Phillip I. Good Introduction to Statistics Through Resampling Methods and R, Wiley, (2013)

ADDITIONAL BIBLIOGRAPHY
- Michael R. Chernick Bootstrap Methods: A Guide for Practitioners and Researchers, Wiley, (2007)

- Phillip I. Good Resampling Methods A Practical Guide to Data Analysis, Birkhauser, (2006)