

Resampling 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. Jackknife methods and permutation tests
 - 2.1 Properties of jackknife 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 (assignments, 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)