

Resampling Techniques

Academic Year: (2021 / 2022)

Review date: 22-06-2021

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)

Técnicas de Inferencia Estadística I
Técnicas de Inferencia Estadística II
Métodos de Regresión

OBJECTIVES

SPECIFIC SKILLS

1. To know the basic techniques about resampling methods
2. To know and use statistical software to work with resampling techniques.

TRANSVERSAL COMPETENCES:

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

DESCRIPTION OF CONTENTS: PROGRAMME

- 1 Introduction to resampling methods: bootstrap and permutations
 - 1.1 Examples of classical problems of estimation
 - 1.2 Introduction to resampling methods
- 2 Applications of bootstrap methods and permutations methods in data structures
 - 2.1 Theoretical issues of bootstrap methods
 - 2.2 Introduction to program bootstrap methods in R
- 3 Bootstrap based confidence intervals
 - 3.1 Justification of alternatives of bootstrap confidence intervals
 - 3.2 Application of bootstrap confidence intervals with R
- 4 Bootstrap based tests of hypotheses
 - 4.1 Bootstrap hypothesis tests
 - 4.2 Permutation hypothesis tests
5. Jackknife methods
 - 5.1 Properties of jackknife estimators
 - 5.2 Application of jackknife methods with R
- 6 Resampling methods in linear models and time series analysis.
 - 6.1 Regression models with bootstrap
 - 6.2 Time series analysis with bootstrap

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

Final Exam (40%)
Exercises and practices (60%)

% 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)