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Industrial Statistics

Academic Year: (2022 / 2023)   **Review date: 17-05-2022**

Department assigned to the subject: Statistics Department

Coordinating teacher: AUSIN OLIVERA, MARIA CONCEPCION

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Calculus I and II
Algebra
Statistics

OBJECTIVES

The course has two parts: Forecasting and reliability.
In the first part you learn to forecast variables. For example you can forecast the evolution of a company's sales, or monthly unemployment in Spain. We will use univariate ARIMA models.
In the second part you will learn to estimate the duration of processes and / or components. This is the basis of reliability analysis. We use parametric and nonparametric estimators for complete or censored data.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Time Series Analysis.
1.1 Introduction. Characteristics of a time series: Trend, homoscedasticity and seasonal cycle.
1.2 Stationary Time Series.
1.3 Transformation on non Stationary Time Series into Stationary Time Series.
1.4 Simple and partial autocorrelation function.
1.5 Models AR (1) AR (2) and AR (p)
1.6 Models MA (1), MA (2) and MA (q)
1.7 ARMA Models
1.8 ARIMA Models
1.9 Estimation and diagnosis.
1.10 Forecasting
1.11 Seasonal ARIMA Models
12.1 Forecasting with seasonal ARIMA models

2. Reliability
2.1 Introduction to duration data (ADS)
2.1 Functions used: reliability function and failure rate
2.3 Types of failure rates.
2.4 Parametric models: Weibull
2.5 Graphical Methods to determinate the model.
2.6 Duration estimation for complete data.
2.7 Censored Data. Types of censorship.
2.8 Graphical methods for censored data. Kaplan Meier Estimator
2.9 Parametric Estimation with censored data.
2.10 Accelerated tests (under stress)
11.2 Series and parallel systems. Introduction to complex systems.

LEARNING ACTIVITIES AND METHODOLOGY

Theoretical classes where various analysis techniques are introduced and practical classes where studied techniques are applied to real problems using the computer

ASSESSMENT SYSTEM

Final exam (60%). Midterm exam (40%).

% end-of-term-examination: 60

% of continuous assessment (assigments, laboratory, practicals…): 40

BASIC BIBLIOGRAPHY

- Daniel Peña Análisis de Series Temporales, Alianza, 2005