MA2822
Advanced Statistics

Professor: Christine Keribin

Language of instruction: French – **Number of hours**: 36 – **ECTS**: 3

Prerequisites: MA1300 or equivalent.

Period:　　S6　Elective 01　February to March　IN16DE1, SEP6DE1

　　　　　　　S8　Elective 08　February to March　IN28IE1, SEP8IE1

Course Objectives

This course puts in practice the notions introduced in MA1300 (Statistics). The goal is to face models and methods with their respective limitations. Theoretical and practical elements on parametric and nonparametric statistics, multivariate analysis and statistics under dependence are proposed. Applications from various domains illustrate the ubiquity of those methods. This course provides complementary technical grounds for subsequent studies on Machine Learning or Data Mining.

On completion of the course, students should be able to
- use random modeling parametric and nonparametric statistical techniques
- use the R software
- propose, implement and tune a prediction model
- validate and understand the limits of a statistical model

Course Contents
- Multivariate linear regression, model selection
- Nonparametric regression, nonparametric density estimation, bandwidth selection
- Monte-Carlo methods, resampling method
- Cross-validation of a model

Course Organization

Lectures: 11x3 hr, Exam: 3 hr

Teaching Material and Textbooks
- Slides available on-line.

Resources

Lab and tutorial classes by researchers and PhD students.

Evaluation

2-hr written final exam, closed notes, closed books, computer and calculator not allowed

Mathematics