

Outlier detection and Extreme values theory

Course title - Intitulé du cours	Outlier detection and Extreme values theory
Level / Semester - Niveau /semestre	M2 / S1
School - Composante	Ecole d'Economie de Toulouse
Teacher - Enseignant responsable	RIBATET Mathieu
Other teacher(s) - Autre(s) enseignant(s)	
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Other teacher(s) - Autre(s) enseignant(s)	
Lecture Hours - Volume Horaire CM	21
TA Hours - Volume horaire TD	
TP Hours - Volume horaire TP	0
Course Language - Langue du cours	English
TA and/or TP Language - Langue des TD et/ou TP	English

Teaching staff contacts - Coordonnées de l'équipe pédagogique :

Mathieu RIBATET: + email: mathieu.ribatet@umontpellier.fr + interaction: email, after the classes (since based in Montpellier)

Course's Objectives - Objectifs du cours :

Extreme Value Theory: The aim of this course is to introduce the basic notions to the statistical modeling of extreme events. Extreme events by nature are rare and thus the main difficulty from a statistical point of view is that we focus on the tail of the distribution. Consequently, specific methods should be apply and those form what is known as the extreme value theory. During the lecture you will learn the essential notion of Value at Risk, return levels and return period and will see how one can model block maxima/exceedances using the Generalized Extreme Value / Generalized Pareto distributions. You will apply these concepts use the R software and will learn how to perform a whole extreme value analysis on a data set of your choice.

Prerequisites - Pré requis :

Students should be familiar with the basic notions of likelihood theory (MLE, delta method, Fisher information, ...) and should have a little knowledge of the R language.

Practical information about the sessions - Modalités pratiques de gestion du cours :

Laptops are accepted (and even highly recommended)

Grading system - Modalités d'évaluation :

Final exams + homework

Bibliography/references - Bibliographie/références :

[Coles, 2001] Coles, S. (2001). An Introduction to Statistical Modelling of Extreme Values. Springer Series in Statistics. Springer Series in Statistics, London. [Embrechts et al., 1997] Embrechts, P., Klüppelberg, C., and Mikosch, T. (1997). Modelling Extremal Events for Insurance and Finance. Springer, New York.

Additional information – Informations additionnelles :

Course materials will be posted on my personal webpage.