

- Faculté des sciences
- www.unine.ch/sciences

Time series analysis (3ST2005)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en statistique	Cours: 2 ph TP: 2 ph	controle continu: 1	6

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Automne

Equipe enseignante:

Dr. Clément Chevalier,
Assistant: Matthieu Wilhelm

Objectifs:

The goal of the lecture is to understand the basics of time series modelling and be able to apply these concepts to real data. At the end of the course the student should be able to set up a consistent and valid time series model and compute predictions. They should also be able to have a critical view about their modeling approach and the relevance of the assumptions made.

Contenu:

The core of the course is the study of time series using models based on ARMA and SARIMA processes. This involves, in short, notions about:

- 1) Methods to estimate and remove a trend and seasonality
- 2) Stationary processes
- 3) ARMA models
- 4) Best linear prediction and advanced algorithms for prediction with ARMA processes
- 5) Algorithms for fitting models to the data
- 6) Order selection and diagnostic plots / goodness of fit tests

Forme de l'évaluation:

The final mark will be based on two elements:

- 1) A project to be handed-in during the semester where the students will perform a complete and critical study of a real-life dataset.
- 2) A 2 hour written test which takes place during the last week of the semester.

Unless the professor and the student both agree on a different date, the reexamination will take place at the same time as the examination for the students of the following year.

The student will pass the 2 hour written examination under the same conditions as the ones which apply to the students of the following year.

This includes possible changes regarding the program of the lecture.

In case of reexamination, the grade obtained for the project will not count.

Documentation:

The lecture is widely based on the following book:

P. J. Brockwell and R. A. Davis. Introduction to Time Series and Forecasting. Springer, 2002.

Pré-requis:

Strong background in probability, linear algebra, linear regression, multivariate calculus.

Forme de l'enseignement:

- 6 ECTS credits
- Fall Semester
- Compulsory course for the master in statistics
- Learning activities: 4 hours lectures/exercise series per week.