SF2943 Time Series Analysis 7.5 credits

Tidsserieanalys

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for SF2943 valid from Spring 2012

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

150 university credits (hp) whereas 45 university credits (hp) in mathematics. Including knowledge in Probability Theory and Statistics and Markov Processes (for example course SF1901 and SF1904) and documented proficiency in English corresponding to English B.

Advanced knowledge in Probability Theory is recommended (för example course SF2940).

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

To pass the course, the student should be able to do the following:

- identify trends and seasonal variations in time series
- define and calculate expectation, covariance function and spectral distribution and analyse their relations
- estimate the above quantities for time series data and quantify the uncertainty in these estimates
- predict real time series of different lengths, for instance by recursive methods
- define and apply parametric models of ARMA type and analyse properties of the models
- fit ARMA models to real data and select model order
- explain the generalisations ARIMA and FARIMA of ARMA models
- analyse data with parametric variance models of ARCH type
- formulate models on state-space form, and describe Kalman filtering in generell terms

To receive the highest grade, the student should in addition be able to do the following:

- Combine all the concepts and methods mentioned above in order to solve more complex problems.

Course contents

General introduction to time series. Stationary and non-stationary models, e.g. ARMA- and ARIMA-models. Projections and prediction of time series. Spectral theory. Estimation of parameters and spectra. Models on state-space form and Kalman filtering.

Course literature

Annonseras före kursstart på kurshemsidan.

Examination

- TENA - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- OVN1 - Assignments, 3.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.