Course information for 732A62 – Time Series Analysis

Learning activities

The course consists of

- 10 lectures,
- 6 computer lab sessions,
- 3 teaching sessions and,
- a final examination which is computer-based but pen and paper derivations will be necessary, and these derivations are graded along with the code.

Lectures

Lectures will consist of both presentations on screen as well as whiteboard derivations. Presentation files will be uploaded to LISAM to the folder *Course Documents* in pdf format few days before each lecture. Lecture titles are roughly as listed below:

1. Introduction
2. Exploratory analysis and Time Series Regression
3. Introduction to ARIMA
4. ARIMA models 1: Difference equations, Forecasting
5. ARIMA models 2: Forecasting, Estimation, ARIMA, Model selection
6. ARIMA models 3: Model selection, Seasonal models
7. State Space Models: Filtering and smoothing
8. State Space Models: Learning Linear state space models, stochastic volatility
9. Deep learning methods: RNN
10. Summary

Computer labs

The students are suggested to do the computer labs in groups of 2. Students are recommended to work independently on each assignment and discuss the solutions with their partner after they have tried on their own. Finally, students should compile a report jointly. Students are welcome to have discussions within a group during the laboratory. Attendance at the lab sessions is not mandatory but it might be difficult to complete the lab without supervision. Only one of the group members is expected to submit the lab report via the functionality “Submit” of the respective computer lab in LISAM/Submissions. **Attention: there is a deadline for each computer lab report!**

The file should be named *Group X.pdf* (where X is your group number)

The document should clearly state the names of the students that participated in its compilation and a short description of how each student contributed to the report.

Passed computer lab reports will earn each student 1 ECTS credits with grade pass/fail. Computer labs may be done using the programming language R. Other programming languages are not supported by the teaching staff.

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Teaching sessions

At the teaching session, the teacher presents solutions of some exercises on the whiteboard. Similar exercises are given to the students for self-studies. Selected exercises are required to be solved by each student and handed in via LISAM. **Passed hand-in assignments will earn each student 1 ECTS credit**. The exam problems will not be far from such problems. Attendance of the teaching sessions is not mandatory.

Missing submission deadline

Missing deadlines without a reasonable cause is not recommended. The course examiner may defer correction of late submissions to future examination rounds.

Office hours

Course teacher, Dr. Tohid Ardeshiri, will be available every Thursday morning 09:00-12:00 at his office room (RUM 3E:485) to answer your possible questions in person. Otherwise, you can send an email to tohid.ardeshiri@liu.se.

Examination

The completed hand-in assignments and passed computer lab report will earn each student 2 ECTS credits where the grading is pass/fail.
The final computer-based examination is graded A-F and earns a successful student 4 ECTS credits. In total the course offers a maximum of 6 ECTS credits.

Students may bring any hand-written and printed material to the computer-based examination. The total number of pages of such aid material may not exceed 2000 pages. No online aid or resource such as phones and tablets may be used during the examination.

To succeed in the exam, a student should have

- read the course theory,
- solved the assignments given as take-home,
- completed all computer lab tasks,
- and be able to interpret and use the printouts of the software R.