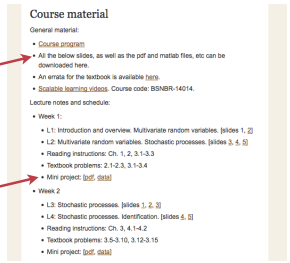
Time Series Analysis

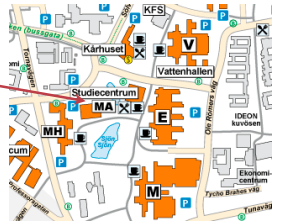
Fall 2018

Andreas Jakobsson

Administration

- Course program
- Course webpage
  http://www.maths.lu.se/kurshemsida/fmsn45masm17/
- Registration
  Sign up, check, add social security number.
- Book
  2nd Edition. Available online and from studiecentrum.





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Teaching staff

Prof. Andreas Jakobsson, MH:217, aj@maths.lth.se
Office hours: Mon, Wedn 11-12 (until 19/12)

Adham Sakhanini, MH:132
Office hours: Tue 10-12 (26/11 - 19/12)

Ola Björnsson, MH:132
Office hours: Mon 8-10 (26/11 - 19/12)

David Montgomery, Amanda Nilsson

Tutorial exercises

The tutorials will be held on Thursdays and Fridays; see schedule.

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Regular problems

Regular textbook problems from the course book.

Mini projects

There are three mini-projects to prepare you for the computer exercises. These are *voluntary*.

Computer exercises

The course examination consist of 3 **mandatory** computer exercises. They take a **long** time; come **well** prepared. Sign up on the webpage. If you are not done, try to get graded at a later exercise.

Computer exercise 0 is *voluntary* and review stochastic processes.

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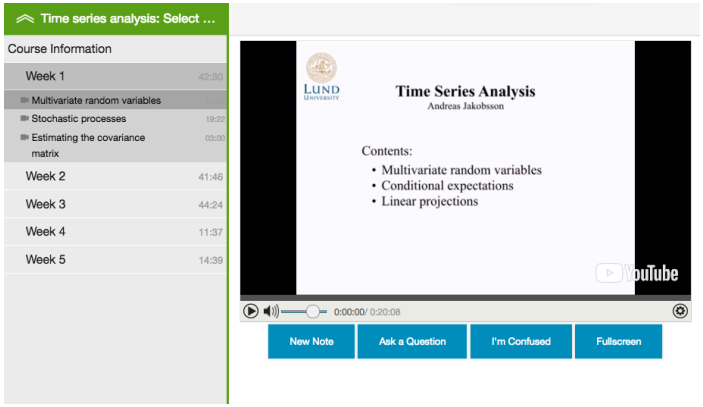

https://www.scalable-learning.com

course code: KCUJA-69690

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Examination

The examination consist of the **computer exercises**, a **take-home exam** and a **project**.

Project examination will take place on **21/12 (13-16)** or on **18/1 (13-16)**.

A detailed **project report** and **presentation material** should be handed in *no later* than at the start of the presentation.

The take-home is available at 12.00 on 14/1, and is due **21/1, at 13.15**.

	Max	Pass
Computer exercises	P/F	P
Take-home exam	30	15
Project presentation	P/F	P
Project report	60	30

LTH		NF	
3	45	G	45
4	60	VG	70
5	75		

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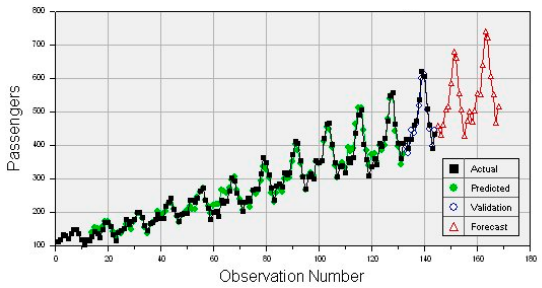
CEQ

After the course, you will be asked to provide an evaluation of the course (via email). *Please do this!!!*

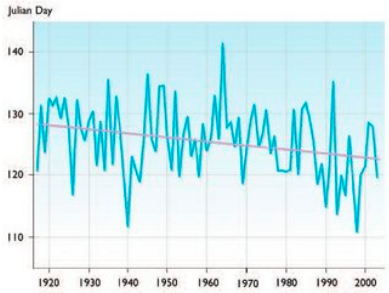
Looking at the earlier evaluations:

- The course is deemed rewarding and relevant.
- The course is uniformly consider **demanding**.
- The labs are seen as very helpful for the project, but many comment on that they take a lot of time. Come well prepared.
- The project is challenging - it take **a lot** of time, but is also quite rewarding.

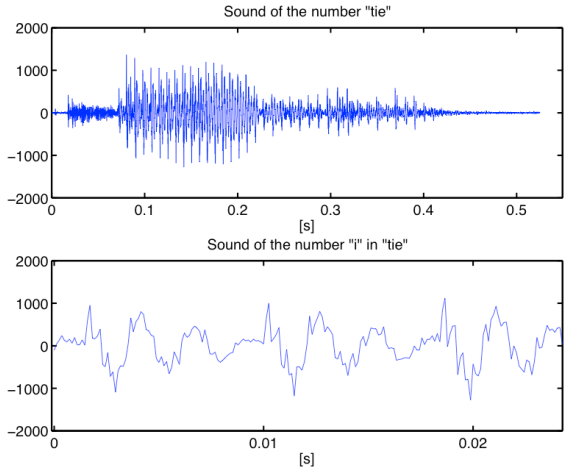
Course representative?

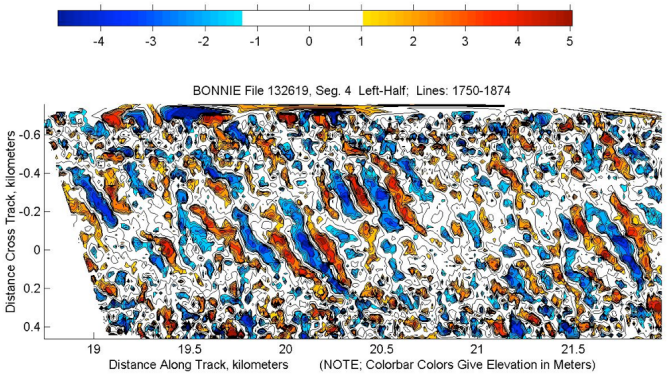


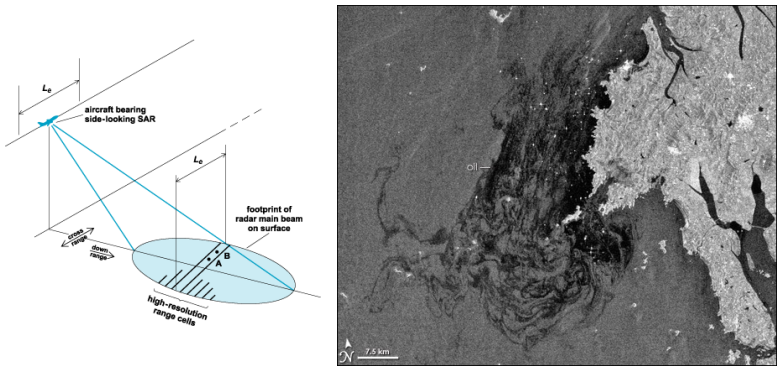
Number of airline passengers



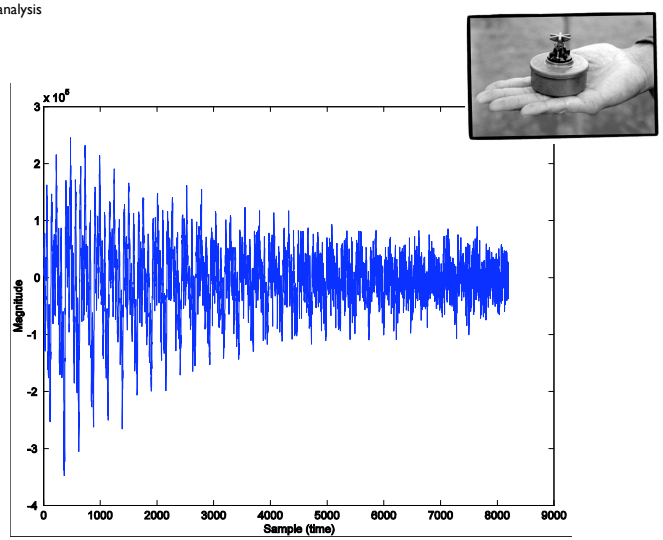
Average ice breakup date of the Tanara River



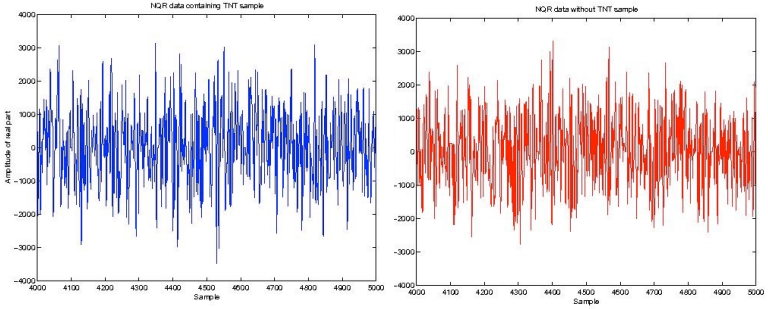




SAR image of oil spill covering the costal waters of the Yellow Sea, South Korea, Dec. 11, 2007



NQR signal from 180 g TNT (2000 measurements ≈ 8.5 h).



NQR signal from 180 g TNT (4 measurements).

Course content

This course treats:

- Modelling of linear stochastic systems
- Pre-treatment of measurements
- Prediction, filtering and reconstruction
- Parameter estimation
- Model selection and validation
- Recursive techniques
- Spectral estimation

What to do next:

- Stationary and non-stationary spectral estimation (VT1, 2020).
- Non-linear time series analysis (HT1+2).
- Financial statistics (HT2).
- Valuation of derivative assets (HT1).
- **Loads of cool thesis projects!!**

This week

We will cover

- Multivariate random variables. Stochastic processes.
- Reading instructions: Ch. 1, 2, 3.1-3.3
- Problems: 2.1-2.3, 3.1-3.4
- Three video lectures!