



PREDICTIVE CONTROL FRTN15 2012

Welcome to the course *FRTN15 Predictive Control* given by the Department of Automatic Control, Lund University

Home Page

www.control.lth.se/Education/EngineeringProgram/FRTN15.html

Personnel

The lectures are given by Bo Bernhardsson bob@control.lth.se, tel. 046-222 8786, office M:5142). Problem solving sessions and labs are given by Jerker Nordh (tel. 046-222 8760, jerker@control.lth.se, Office hour W 13-14, M:2112); Meike Stemmann (tel. 046-222 9745, meike@control.lth.se, Office hour W 13-14, M:2156). News are available on www.control.lth.se/course/FRTN15.

Prerequisites

Automatic Control (FRT 010) & Some background in discrete-time signals and systems.

Course Material

- Lecture notes: *Predictive and Adaptive Control* (R. Johansson), KFS, Lund, 2011.;
- Additional reading for interested: K. J. Åström and B. Wittenmark *Adaptive Control* (2nd ed.), Addison Wesley 1995;
- Lab manuals and solutions are available on the web site www.control.lth.se.

Lectures

Lectures will be held in M:E on Tuesdays 13.15–15.00 and in M:B on Thursdays 8.15–10.00; For a detailed schedule see the home page

Problem Solving Sessions

Problem solving sessions are given on Fri 10-12, M:X2b except E1 which is a held in lab B.

W.	Date	N ^o	Contents
36	7/9	E 1	Simulation of adaptive systems./Meike Stemmann
Notice simulation session in Lab B.			
36	14/9	E 2	Real-Time Parameter Estimation.
37	21/9	E 3	Optimal Prediction. Optimal estimation. Kalman filter.
38	28/9	E 4	Adaptive Control
39	5/10	E 5	Iterative Learning Control (ILC).
40	12/10	E 6	Model Predictive Control
41	19/10	E 7	Stability. Exam questions.

Interaction

Use email, office hours, hand-ins, tutorials and lectures for interaction with the instructors. There will also be a FAQ on the home page.

Computer Simulations

Computer simulation is an excellent way to explore predictive systems for development of insight and ideas for analysis. Simulation is also required for the problems you have to hand in and for several projects. An introduction to computer simulation is given in Exercise #1. You will use your LTH-account for the computers.

Labs

Lab 1 and Lab2 are held in Lab B, lab3 is in lab C in the M-building. Lists for signing up are available on the FRTN15 home page.

Lab	Time	Contents	Responsible	Phone	Room
Lab AR1	w.38	Autotuning	Meike Stemmann	222 9745	M:2156
Lab AR2	w.40	Adaptive Control	Marzia Cescon	222 8784	M:2158
Lab AR3	w.41	Predictive Control	Jerker Nordh	222 8760	M:2112

Hand-ins

There will be three home-work problems that you have to solve and hand in, see home page for more information. Handin or email solutions to

HW	Deadline	Contents	Hand in to
HW1	Sep 20	Signals and Systems	Jerker.Nordh@control.lth.se
HW2	Sep 27	Adaptive Control	Meike.Stemmann@control.lth.se
HW3	Oct 11	Model Predictive Control	Jerker.Nordh@control.lth.se

Projects

The projects will be done individually or in small groups. A list of projects will be handed out. You should sign up for a project no later than Friday, October 7. The project should be presented on Friday, December 2, at 10-12.

Examination

The examination will be of a problem solving type. You may use the text-book at the examination. It is to be held on Monday, October 25, 8.00–13.00 in lecture halls M:L1, M:L2.