EJ2230 Control in Electrical Energy Conversion 6.0 credits

Reglering för elektrisk energiomvandling

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

Establishment

Course syllabus for EJ2230 valid from Spring 2015

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Knowledge equivalent to EJ2201 and EJ2301. English 6 or equivalent

Language of instruction

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

Intended learning outcomes

Aim of the course is to give the students ability to design and analyse control systems for electrical energy conversion. The course focuses primarily on control of voltage-source converters, both in electrical machine drives and connected to the grid.

After completed course the student should be able to

- contruct and apply models for the electrical energy conversion process, mainly machine, grid and load models;
- understand the different time scales on which key variables in the electrical energy conversion process evolve;
- close various control loops with suitably selected controller structures and with appropriate parameter choices;
- analyse the stability and sensitivity of control loops;
- understand the principles of estimation of variables which cannot be measured and the implications of estimation on the system performance.

Course contents

Circuits and systems in power electronics and drives.

Voltage-source converters.

DC motor drives.

AC motor drives.

Fundamentals of vector control.

Vector current control.

Vector control of PM synchronous machine drives.

Vector control of induction machine drives.

Vector control of grid-connected converters.

Disposition

Lessons, exercises, computer-aided exercises and project .

Course literature

Textbook EJ2230, KTH.

Examination

- PRO1 - Project Work, 2.0 credits, grading scale: P, F
- TEN1 - Written Exam, 4.0 credits, grading scale: A, B, C, D, E, FX, 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.

Other requirements for final grade

TEN1, written exam, 4 hp

PRO1, project assignment, 2 hp

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.