FEJ3311 Modulation of Power Electronic Converters 8.0 credits

Effektelektronisk modulation

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

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

Establishment

Course syllabus for FEJ3311 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Language of instruction

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

Intended learning outcomes

After the examination the student should be able to

·Define fundamental concepts in pulse-width modulation

·Describe differences between different principles of modulation regarding properties such as harmonics and dynamic conditions

·Know different carrier based modulation methods and their synthesis.

·Use different methods for analysis of carrier based modulation methods

·Calculate pulse-patterns for harmonic elimination

·Estimate stray losses in electrical machines due to harmonics.

Course contents

Circuit modelling, fundamental mathematics, harmonics in single-phase and three-phase systems, survey of modulation principles, relation between modulation and the development of power-semiconductors, carrier-based methods, SPWM and space vector modulation, influence of sampling, fixed pulse-patterns, harmonic elimination, tolerance band modulation, harmonics in power systems and electric railway traction, norms and standards, influence of harmonics on electrical machines, survey of harmonic filters.

Disposition

Lectures 16 hours, computer exercises 8 hours, Laboratory work 4 hours,55 hours individualized project

Course literature

D. G. Holmes, T. Lipo., “Pulse Width Modulation for Power Converters”.Wiley Interscience.

Examination

- EXA1 - Examination, 8.0 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.

The individualized project should preferably be linked to the student’s own research.

Other requirements for final grade

Projects and laboratory reports

Written examination

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.