FEG3213 FACTS and HVDC in Electric Power Systems 10.0 credits

FACTS och HVDC i elkraftsystem

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

Establishment

Course syllabus for FEG3213 valid from Autumn 2011

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

The course is intended for Ph.D. students in electric power systems, but can also be interesting for students from other fields of electrical engineering.

Language of instruction

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

Intended learning outcomes

Upon completion of the course the student should be able to

- describe how FACTS and HVDC are designed,
- explain and analyze their functions,
- derive basic mathematical models for these components,
- analyze the impact of these components on power system stability,
- perform calculations on different control strategies for these devices.

Course contents

FACTS (Flexible AC Transmission System) and HVDC (High Voltage Direct Current) are controllable devices whose functions are to enhance the security, capacity and flexibility of power transmission systems. Application of these components in power systems implies an improvement of

- transient stability
- voltage stability
- damping of power oscillations
- optimal power flow

The course is given in English, and starts with a review of static and dynamic issues in power systems. As a technical solution to these issues, FACTS and HVDC will be presented. It will be shown that FACTS and HVDC may be a technical solution to these issues. It will be discussed in the course how these components are designed and also what functions they have. Then, basic mathematical models and control strategies will be presented for these components to analyze the impact of these components on power system stability.

Disposition

Lectures, lab, home exam and project.

Course literature

M. Ghandhari,"The Impact of FACTS and HVDC Systems on Transient Stability and Power Oscillation Damping"

Examination

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.

The result of the project is reported in a technical report.

Other requirements for final grade

- Approved home exam.
- Approved lab.
- Approved technical report.

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.