EG2120 FACTS and HVDC in Electric Power Systems 7.5 credits

FACTS och HVDC i elkraftsystem

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

On 2020-10-13, the Head of School of EECS has decided to establish this official course syllabus to apply from the spring semester 2021 (registration number J-2020-2220).

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Language of instruction

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

Intended learning outcomes

After passing the course, the student should be able to

1. create basic mathematical models for controllable components (FACTS and HVDC) and based on these be able to carry out load flow analysis and stability analysis of electric power system and apply different control strategies for these controllable components
2. present, analyse critically and explain simulation results about the effect of controllable components on power system stability and damping,.

Course contents

FACTS (Flexible AC Transmission System) and HVDC (High Voltage Direct Current) transmission are power electronics-based devices whose functions are to enhance the capacity, security and flexibility of power transmission systems. Application of these components in power systems implies an enhancement of transient and voltage stability, increase of power oscillation damping (POD) and improvement of power flow under undisturbed or post-fault conditions. The course starts with a short review of some issues (or problems) that an electric power system may face. Next it is discussed how these components are designed and what their main properties are. The following lectures focus on the use of the FACTS and HVDC transmission as technical solution to the issues described earlier. Basic mathematical models and control strategies used to analyze the impact of these devices on power system stability are presented. Most part of the analysis is dedicated to POD which is the main topic of this course. Lectures for the use of the main features of the necessary software are scheduled.

Specific prerequisites

Completed courses corresponding to:

- EG2110 Stability and control of electric power system
- EJ2301 Power electronics.

Active participation in a course offering where the final examination is not yet reported in LADOK is considered equivalent to completion of the course.

Registering for a course is counted as active participation.

The term 'final examination' encompasses both the regular examination and the first re-examination.

Examination

- PRO1 - Project, 7.5 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.

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.