



EG2070 FACTS and HVDC in Electric Power Systems 7,5 hp

FACTS and HVDC in Electric Power Systems

Fastställande

Kursplan för EG2070 gäller från och med VT14

Betygsskala

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

Utbildningsnivå

Avancerad nivå

Huvudområden

Elektroteknik

Särskild behörighet

EG2110 Stabilitet och styrning av elkraftsystem, EJ2300 Effektelektronik, samt engelska B eller motsvarande.

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

To be able in a written report and orally to

- describe how FACTS and HVDC are designed,
- explain their functions and abilities,
- derive basic mathematical models for these components, and apply these models to load flow, modal analysis and transient stability analysis,
- present and apply different control strategies to these devices,
- present, describe and explain results of simulations about the impact of these devices on power system stability, and power oscillation damping
- critically analyze other related projects

Kursinnehåll

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 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.

Kursupplägg

The course is given in English, and preliminary includes 14 lectures (28 h), 18 project work hours (36 h), 2 labs (8 h) and examination. During the supervising hours, the teaching assistants will be available to assist the students with the questions and preparatory work of the laboratories.

Kurslitteratur

"The Impact of FACTS and HVDC Systems on Transient Stability and Power Oscillation Damping"

M. Ghandhari, et. al

Examination

- PROJ - Projekt, 6,0 hp, betygsskala: A, B, C, D, E, FX, F
- LAB1 - Laboration, 1,5 hp, betygsskala: P, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

The examination consists of a project work (home exam) and is divided into three parts: written report, oral presentation and acting as an opponent to assess one of the other project works. Furthermore, there is some compulsory progress activities, where the student will show his/her progress in the project work.

Övriga krav för slutbetyg

Project (home exam), 6 (hp).

Two laboratory exercises (incl. compulsory preparatory work), 1.5 (hp).

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.