EE-603

Transient and dynamic analysis of electric power systems

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Cursus	Sem.	Type
Electrical Engineering		Opt.
Energy		Opt.

Language of teaching	English
Credits	3
Session	
Exam	Written
Workload	90h
Hours	**42**
Lecture	34
Practical work	8
Number of positions	

Frequency

Every 2 years

Remark

Next time: Winter 2021

Summary

The learning outcome is to increase the knowledge of simulation methods and the role of computers in the management and the operation of electric power systems.

Content

• Dynamic phenomena:

- Frequency range
- Power system components modeling
- General mathematical formulation
- Transient stability: direct approach, time domain approach, ...
- Small signal stability: eigenvalues, eigenvectors, participation factors, poorly damped modes, ...
- Long term stability: load frequency control, automatic generation control, ...
- Examples of applications

• Transient phenomena:

- Sources of disturbances and transients in power systems.
- Generalized transmission line theory for a multiconductor line
- Parameters of a multiconductor transmission line
- Effect of losses due to the ground finite conductivity and corona
- Interaction with an external electromagnetic field
- Solution methods in time and frequency domains (FDTD method and BLT equations)
- Treatment of frequency dependence in a time domain algorithm
- Treatment of nonlinearities in a frequency domain algorithm
- Examples of application

Learning Prerequisites

Recommended courses

Power Systems, Electromagnetism