Electromagnetic modeling of machines

Component
École Nationale Supérieure d'Électrotechnique d'Électronique d'Informatique d'Hydraulique et des Télécommunications

In brief

- **Ametys Code:** N7EE03B
- **Open to exchange students:** Yes

Presentation

Objectives

The course aims to provide machine modeling tools. It also familiarizes students with the structural specificities of rotating machines, such as symmetries, periodicity, the concepts of smooth or salient poles, saturation, and notching effects, all of which are distinguishing features that significantly impact expected performance.

Description

By the end of the course, students will be able to:

- Distinguish between different types of rotating magnetic machines, synchronous or asynchronous machines, smooth poles or salient poles
- Establish basic analytical relationships in order to define a control model
- Deploy the modeling method with the ultimate goal of obtaining a simple steady-state or transient model that can be used, for example, to calculate short-circuit currents or efficiencies.
- Obtain a model for controlling the machine powered by a static converter.
- Calculate steady-state operating points and define the machine's operating ranges in the torque-speed plane.