Design and implementation of Static Converters

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

In brief

- **Ametys Code:** N7AE03B
- **Open to exchange students:** No

Presentation

Objectives

+ Understand the principle and circuitry of the switching cell

+ Understand the transformations of electrical quantities performed by the cell and be able to use them on the time scale of instantaneous switching phenomena and at low frequencies

+ Understand the principle and limitations of pulse width modulation.

+ Identify switching cells in a diagram and use this information to identify the degrees of freedom they provide for controlling power transfers

+ understand the causal relationships that govern power transfers through switching cells

+ understand the operating rules of switching cell switches (static and dynamic) and be able to use them to construct the static and dynamic characteristics of switches

+ understand and use the controlled or spontaneous characterization of switching cell switch transitions

+ Be able to size the cell's semiconductor components and associated passive components to control operating conditions

+ Be able to synthesize the semiconductors (and any switching management circuit) necessary to obtain the static and dynamic characteristics identified for the switches

Description

Knowledge is imparted during eight 1 hour 45 minute sessions and assessed in a 1 hour exam.

Certain principles are introduced and certain cases are dealt with during exercise sequences integrated into the lessons, so that students can easily identify the objectives and purpose of the approach.

Pre-requisites

+ Methods for analyzing electrical circuits (Thevenin, Norton, Millman, Kirschoff's laws, etc.)

+ Characteristics and Ohm's laws for reactive components: capacitors, inductors, transformers

+ Semiconductors operating in switching mode: transistors, diodes, thyristors

+ Basic logic circuits