



CONVERSION ÉLECTROMÉCANIQUE

ELECTROMECHANICAL CONVERSION

Lecturers: Eric VAGNON

| Lecturers : 14.0 | TC : 14.0 | PW : 6.0 | Autonomy : 14.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

The objective of this course is to present the electromagnetic phenomena with their energetic aspects and to show how to pass, starting from the fundamental concepts of electromagnetism, to the design of an electric machine. This approach is presented on the example of the synchronous machine and illustrated by the various uses of this machine. This approach will be generalized to other types of electric motors in order to design electrical models that can be used for speed variation.

Keywords : Electromagnetic energy, force and power, actuator, conversion structures, frequency-power, synchronous machine, alternator, network, motor, electrical behaviour models, control

Programme

- Introduction: historical aspects and background of converter design.
- Force and mechanical power in electromagnetic systems
- Conversion structures
- Constitution of a synchronous machine
- Technological aspects
- Electrical models
- Control and command in the main applications.

Learning outcomes

- Adapt the fundamental concepts of electromagnetism into terms of designing an electrical machine.
- Adapt this approach to the synchronous machine.
- Create electromagnetic models of different levels from constructive data.
- Analyse an electrical model of an electromechanical converter in view of its control and or command.

Independent study

Objectifs : Autonomous work consists in sizing a system based on specifications and establishing a model that will validate this sizing. The system will be studied in pairs with a student following the Power electronics module. The evaluation is carried out through an exchange of each pair with a teacher of the discipline in order to demonstrate the relevance of the dimensioning carried out and the

Méthodes : Sizing a device using an analytical approach. Construction of a model and verification of the relevance of the design elements.

Core texts

Marcel JUFER, *ELECTROMÉCANIQUE*, raité d'électricité de l'EPFL - vol XIV, 1995
Ernest MATAGNE *ELECTROMÉCANIQUE - CONVERTISSEURS D'ÉNERGIE ET ACTIONNEURS*, DUNOD, 2009

Assessment

Final mark = 70% knowledge + 30% know-how
Mark knowledge = 100% final exam
Mark know-how = 50% final exam + 50% continuous assessment