ZOE powertrain project

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

In brief

- **Ametys Code:** N8EE15E
- **Open to exchange students:** Yes

Presentation

Objectives

1) Acquire a cross-disciplinary overview of the skills taught within the department's energy specialisation in order to better understand the links and complementarity between the different areas of knowledge and skills (design of electromechanical actuators, power electronics, automation and control)
2) Design of electromechanical actuators: Acquire a methodology for the analytical pre-dimensioning of three-phase electric machines
3) Power electronics: Understand the interactions between converters and electric machines when they are combined, and model the achievable operating limits in the torque-speed plane
4) Automatic control: Design scalar and vector control architectures for three-phase electric machines, and develop strategies for controlling their torque

Description

The project consists of designing an electromechanical chain for use in the traction system of a city car-type electric vehicle. This design involves a comprehensive approach which, based on a given set of specifications, begins with an analysis of the specifications and the sizing of the electric motor. Once the motor has been sized, it is powered by an inverter connected to the vehicle's battery. The resulting electromechanical chain is then analysed to determine the operating limits of the assembly. This

Non-contractual information.
Last update on 28 October 2025

analysis is essential to understanding how to design the control strategy for the assembly. The system control architecture and associated control strategies are then developed to enable the system to achieve the various operating points required by the specifications.

Pre-requisites

Course 'N8EE15D - Machine Control'

Course 'N8EE15C - Converter Control'

Course 'N8EE15F - Motor Sizing for Electric Vehicles / Design Elements of CVS-Machine Combinations'

Non-contractual information.
Last update on 28 October 2025