X. Levels

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Ametys Code:** N9EE23C
- **Open to exchange students:** Yes

Presentation

Objectives

Understand and analyze the potential advantages of series/parallel connection and understand the difficulties of implementation. Manage degrees of freedom and constraints in multilevel converters.

Study methods of controlling static converters by Pulse Width Modulation (PWM): principles and implementation. Apply to voltage converters. Extend to multilevel converters. Analyze using the 2N vector approach, then multilevel.

Description

X-level converters

- Problem of constraint distribution in series/parallel semiconductor combinations.
- Evaluation of different solutions.
- Multilevel converters (FC, NPC, SMC, etc.).
- Spectral properties.
- Industrial applications.

PWM, Vector Control

· Pulse Width Modulation converters, analysis of single-phase characteristics, determination of three-phase vector control using a systematic approach:

· Vector control of three-phase voltage converters (SVM).

· Multilevel Vector Control – Modulator Optimization – Use of State Machines

Application project for “multilevel converters” and “vector control” CMs. Case study, sizing, and validation by numerical simulation (PLECS