

Control MSc projects proposed by C.A. Hernandez A.: 2004-05

VSI model for power system analysis

Project #: CAHA1

This project aims at finding a reduced model for a voltage source inverter. The model has to capture the main characteristics of a full-size model, and yet be small enough to ease its incorporation into a power system simulation. The target of this project is then a well balanced VSI model between accuracy and simplicity. This work builds on Ms. Kroutikova's thesis project which was aimed at developing a full-size model of the inverter.

Dynamics of power converters in power systems

Project #: CAHA2

This project compares the dynamic performance of an inverter-based generator against that of conventional generators (usually based on synchronous machines). The ground for comparison is the dynamic response of both systems during a fault in the power system in which they are embedded. This project includes fault ride-through capability.

Optimal sizing and operation of energy storage devices

Project #: CAHA3

The challenge of this project is to find the optimal size of an energy storage device and envisage a control strategy that would maximise the profits of its owner. Some of the variables that play a role in the optimisation process are the daily electricity price, the energy per unit of volume, the efficiency of the storage technology and (tentatively) the capital cost of the system.

Safe-mode control strategy for power converters

Project #: CAHA4

Most of the studies related to power converters focus in the scenario when everything around them works fine. There are, nevertheless, important questions to answer when things go wrong. How does a “typical” power converter behave when there is a fault (say a single-phase-to-earth fault) in the vicinity? How should it safely shut down? What are the fault ride-through capabilities of a power converter based generator?