

Power Quality in Microgrids

Organizer: Professor Josep M. Guerrero, Associate Professor, Juan C. Vasquez

Lecturers: Professor Josep M. Guerrero, Postdoc Mehdi Savaghebi, Assistant Professor Joaquin Eloy-Garcia (Carlos III University of Madrid), Assistant Lecturer Alexander Micallef (University of Malta), Francisco Freijedo (École polytechnique fédérale de Lausanne EPFL, Switzerland)

ECTS: 3

Date/Time: April 26-28, 2017

Max no. of participants: 20

Description: Microgrids are deemed as one of the main building blocks of the smart grids; since, are able to facilitate implementation of many smart grid functions. It is expected that in a near future, smart grid emerges as a well-planned plug-and-play integration of Microgrids which interact through dedicated highways for exchanging commands, data, and power. Providing a high power quality for the customers is one of the main objectives in smart grids.

On the other hand, the proliferation of different nonlinear and single-phase loads in electrical systems has resulted in voltage harmonic and unbalance as two common power quality problems. In addition, harmonic resonances can be excited giving rise to significant increase of the voltage distortion. These phenomena can cause variety of problems such as protective relays malfunction, overheating of motors and transformers and failure of power factor correction capacitors.

In this course, measurement, compensation and damping of such power quality problems will be addressed through several control approaches. Both three-phase and single-phase voltage source inverters will be considered. The modelling and control of these power electronic converters are discussed and hierarchical and decentralized control approaches are presented in order to enhance the voltage quality. Several simulation exercises will be included in labs which cover about 50% of the course time.

Prerequisites: Matlab/Simulink knowledge is recommended for the exercises.

Link: <http://www.et.aau.dk/phd/phd-courses/>