

Master-Thesis:

System-Level Control of AC/DC Microgrid

Context:

Nowadays, more and more distributed energy resources (DER) are integrated to the distribution system like renewable energy sources (RES), energy storage systems (ESS) and controllable loads. In active distribution grids, these power-electronics-interfaced units participate in the regulation of the system. In addition, the advancements in power electronics converters stimulate the integration of DC links in the existing AC distribution networks and thus the development of hybrid AC/DC networks. In this context, the research project Flexible Electrical Networks (FEN) focuses on the development, implementation and analysis of converter-dominated AC/DC systems. In the framework of the FEN project, the ACS Institute participates in the development of control structures for local distribution grids, like AC/DC microgrids.

Student tasks:

The student shall work on the control of an AC/DC microgrid already developed in the FEN project. In particular, the student will develop in Matlab/Simulink primary-level controllers on top of already developed converter-level controllers. Different structures and functions of primary-level control will be investigated, for the synchronisation of the inverters. The stability of the overall control structure and the interactions between converter-level and primary-level controllers will be analysed. In addition, the interactions between several inverters in the system will also be investigated.

Your profile:

- Good knowledge of power systems and control theory
- Matlab/Simulink knowledge is a prerequisite skill

The collaboration with the supervisor will be done in English and the thesis should be written in English.

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