

Bachelor-/ Master-Thesis

InterFlex – Model Predictive Control for Microgrids



InterFlex is a Horizon 2020 project and investigates the interactions between flexibilities provided by energy market players and the distribution grid, with a focus on battery energy storages, demand response through energy management, islanding, grid automation and the integration of different energy carriers (P2H). Particularly, the project focuses on advanced control algorithms, such as, model predictive control (MPC) for islanded microgrids.

One of the challenges is the optimal control of islanding microgrids under the influence of high shares of intermittent renewable energy sources (RES) and fluctuations on the demand side. MPC is a promising approach to solve this problem for a specified time horizon since it allows integrating a cost minimizing objective function and system boundaries while taking demand and supply predictions into account. As a use case, the MPC will be evaluated in the context of the Swedish demonstration site in Simris.

An agent-based MPC scheme is expected to be developed that enables the analysis of local energy neighborhoods compared to the conventional central approach. Based on this the following subtasks can be formulated.

- Literature research:
 - MPC
 - Distributed optimization
- Development of the MPC scheme
- Integration of forecasts
- Modelling:
 - Rule based control (use case)
 - Central control (MPC)
 - Distributed control (MPC)
- Sensitivity Analysis

For further information, please contact:

M.Sc.
Gonca Gürses-Tran
Tel. +49-241-80-49583
GGuerses@eoner.rwth-aachen.de

ACS | Institute for Automation of Complex Power Systems
ERC | E.ON Energy Research Center
RWTH Aachen University
Mathieustr. 10, 52074 Aachen, Germany