

Load Sensitivity Identification During the Demand Control Actions

Description:

To reduce the carbon emission during the power generation, an increasing amount of renewable energy sources (RES) are integrated into the system to gradually replace the conventional fossil fuel power plants. Compared to the conventional power plants, the RESs are highly intermittent and provide few or no inertia. Therefore, new sources of power flexibility (i.e. controllable power) are required and a cost-efficient alternative to provide power flexibility from the demand side.

The load sensitivity describes the how the load power changes when the voltage or frequency changes. According to which, the power consumption of the distribution grid can be modified by controlling the voltage or frequency. The control action requires the up-to-date sensitivity value. However, existing works on sensitivity identification and sensitivity-based control are conducted separately and the coupling between them is missing. To fill this gap, this Master's thesis aims to update the load sensitivity value during the control actions, based on the concept of the perturbation-based identification method.

What we offer:

- Insights in day to day research operations, conducting experiments, and publication process
- Hands-on lab experience in the unique and advanced 1MW Energy Lab 2.0 environment
- Flexible working hours and location and friendly work environment

Your Tasks:

- Literature review on sensitivity identification methods and select a sensitivity calculation algorithm
- Build a sensitivity identification block in cooperation with a P controller in Simulink.
- Verify the identification block with actual loads with the Power Hardware In the Loop (PHIL) setup shown in Fig. 1.

Your Profile:

- Basic knowledge of Matlab and Simulink is required.
- Prefer student with Lab experience
- Language: German or English

Starting date and duration:

Feb. 2024 (can be discussed), 6 months

Contact person:

Qiucen Tao, E-Mail: qiucen.tao@kit.edu

TT-Prof. Dr. -Ing. Giovanni De Carne

Institute for Technical Physics (ITEP), Energy Lab 2.0, B668-Campus North

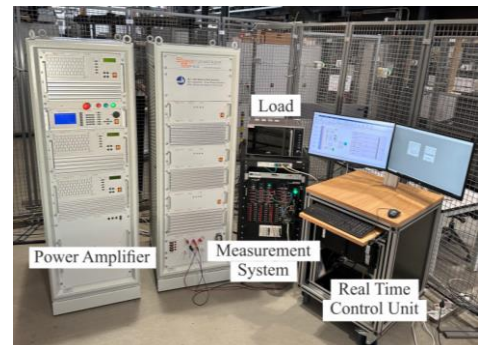


Fig. 1. PHIL Setup

More about
our group

