Impact of compromised Control Systems onto Power System Stability

Master- or Bachelorthesis

The transition in power generation to so-called smart grids brings with it the increased use of information and communication technology (ICT) at the distribution grid level. This poses new challenges for grid operation especially in the area of IT security as ICT-failures or cyberattacks can have a serious impact on the stable and secure power system operation.

The goal of the thesis is the assessment of the impact of manipulated control signals send to a large number distributed energy resources (DERs) located in several distribution grids with regards to power system stability. Therefore manipulation strategies shall be integrated in a dynamic time-domain simulation toolbox for power systems and stability analysis shall be conducted for various scenarios. Using technical evaluation criteria (e.g. the operating limits) the criticality of the manipulation strategies shall be derived.

Goals and core tasks of the thesis

- Literature research on cyberattacks on power systems, power system stability
- Implementation of manipulation strategies for DERs and evaluation criteria for power system stability
- Performance of stability investigations of the energy system using dynamic time-domain simulations

Your profile

- Study of engineering or business engineering (electrical engineering, electrical power engineering)
- Interest in dynamic time-domain simulation
- Knowledge of MATLAB® is an advantage

Contact

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Focus

- Cyberattacks
- Power System stability
- Dynamic time-domain simulation