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Fachgebiet Regelungssysteme
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Vortragsankündigung

Seminar Regelungssysteme LV 0430L654

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"Information and Communication Technology in Energy Lab 2.0"

The stable and reliable operation of future energy systems with more than 80% proportion of renewable energy generation requires the development and experimental test of new concepts and components. Hence, the Helmholtz Association, the ministries BMBF (Germany) and MWK (State of Baden-Württemberg) establish the so-called Energy Lab 2.0 to investigate the interplay of different forms of energy. A central part of the Energy Lab 2.0 is the Smart Energies System Simulation and Control Centre (SEnSSiCC). It contains three parts: (1) The Smart Energy System and Control Laboratory represents a power-hardware-in-the-loop experimental field in the 200 kW range. The designed flexibility supports many smart grid experiments. (2) The Energy Grids Simulation and Analysis Laboratory aims at in-depth-simulation of energy grids and their interconnections from the microgrid scale to a Germany-wide scale. (3) The Control, Monitoring and Visualisation Centre integrates all parts of the Energy Lab 2.0 into a research environment for monitoring, visualisation, and modelling of smart grid constellations. For all of these three labs, the following Information and Communication Technology aspects are of equal importance: (I) Big Data: All system components generate large datasets, mainly in form of time series. These datasets are, e.g., a valuable resource to generate models of subsystems using data mining. (II) Advanced control methods: Within SEnSSiCC, tailored advanced control methods for smart grids are developed, tested and assessed. A major focus is put on distributed fault-tolerant control for load scheduling. (III) Reliable, safe and secure software structures: Intelligent distributed energy systems of the future require reliable, safe and secure software-based functions for communication, cooperation, and control. In order to show exemplarily the depth of investigation in the different parts of the SEnSSiCC, a new data processing pipeline for creating power flow simulation models from raw Open Street Map (OSM) data is shown.