

Seminar

Research area: Smart Grids

Novel Optimization Techniques for Smart Grid Planning, Operation, and Control

The electrical energy infrastructure is one of the modern society pillars. Therefore, guaranteeing a reliable, efficient and sustainable electricity supply has been a challenge for engineers. Notwithstanding, traditional grids are evolving into smart grids, which has given rise to research and developments around the planning, operation and control of these energy systems. In that way, both the high penetration level of distributed energy resources (DER's), such as renewable energies, and the implementation of novel active management systems are huge technical challenges, that are leading to the re-evaluation of conventional design, operation and control techniques. Furthermore, the intermittent nature of the renewables, the use of energy storage systems, the phasor measurement technique in automation technologies, the new operation paradigm of the bi-direction power flow, the active demand side participation, the self-controlled multi-modal networks integration i.a. are requirements that must be considered. The use of novel optimization techniques in the planning, operation and control of smart grids may allow to tackle this upcoming challenges in an efficient and elegant way. These novel optimization techniques can deal with a large number of variables (continuous and discrete), single or multiple objectives, and different constraints. Hence, the purpose of this seminar is to encourage students to explore, identify, and elaborate a literature review based on the state-of-the-art of the application of novel optimization techniques in smart grids planning, operation, and control. Consequently, students will improve their knowledge in this research area as well as their skills related to database searching techniques, papers categorization and quick review, research trends identification, and other relevant research expertise.

The activities and outcomes of the seminar are:

- To elaborate a literature review based on the state-of-the-art of this research area
- To write down a final deliverable in a scientific paper structure
- To report the results of the literature review in an oral presentation

The seminar will be conducted in English and is for master students of Elektro-/Informationstechnik.

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