Institute of Electrical Power Systems

Bachelor Thesis

Meshing in low-voltage grids - Methods, approaches and algorithms

Motivation

Due to ongoing developments in high-power loads (e.g. electric vehicle charging stations, heat pumps or air-conditioning systems) on the one hand and renewable energy sources (e.g. photovoltaic systems, CHP) combined with prosumers (e.g. battery energy storage systems, energy and load control/management) on the other hand, existing low-voltage distribution grids are facing unprecedented challenges with regard to the management of an efficient and effective load flow, but also with regard to the behaviour in the event of a short circuit. Due to the increased use of generators in the low-voltage distribution grid, local overloads of line segments are to be expected, which no longer comply with the planning principles of radial grid topologies.

One approach to tackling this issue can be the meshing (de. Vermaschung) of low-voltage distribution grids. In the course of this bachelor thesis, existing methods, approaches and algorithms are to be examined, compared and evaluated.

Research Topics

- Which methods, approaches as well as algorithms for meshing are available in the literature? (Advantages, disadvantages, requirements, applicability, etc.)
- Can the examined methods, approaches as well as algorithms be used or implemented in different grids - regardless of their voltage level (low, medium or high voltage)?
- What advantages, disadvantages or obstacles are to be expected in their implementation?

Procedure/Methodology/Task definition

- In-depth literature research on the above-mentioned research topics;
- Summary and comparison of the examined methods, approaches and algorithms;
- Evaluation of their applicability with regard to the above-mentioned research topics;
- Presentation of the results resp. findings in the lecture Elektro-/Informationstechnisches Seminarprojekt („Bachelor-Seminar") and documentation in the form of the Bachelor thesis;

Organisational Issues

Begin immediately

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