

# Master Thesis

## Methods of frequency measurement in electrical power systems

### Starting point and motivation

The measurement of the frequency of measured signals of three-phase system has recently gained importance. Here, topics from the field of protection as well as control and regulation of generating plants are of particular interest, for example for compliance with limit values and in the application of modern control schemes for converter-based in-feed, such as in connection with the provision of synthetic inertia.

### Research topics

The aim of the work is to investigate available methods for frequency measurement as a function of data accuracy in order to achieve the desired requirements. In particular, various fault situations and an evaluation of the complexity of the various methods in terms of sampling rate and computational effort shall be considered.

### Scope of Work and Methodology

For the investigation both data from simulations can be generated (with the network calculation program Digsilent Powerfactory) as well as measured data can be used (from blackstart tests with measured frequency fluctuations). In addition to established methods from both literature and practice, the application of non-conventional methods shall be investigated (in cooperation with the Institute for Signal Processing and Speech Communication). These tests are preferably carried out with Matlab. Finally, it is planned to present the results of the thesis at the a presentation of the results of the work at the AK f-measurement of the VDE (Verband der Elektrotechnik, Elektronik und Informationstechnik).

### Organisational Matters

**Start: immediately**

### Supervision

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