

# Master's Thesis

## Short-circuit behavior of the Active Front End inverter

### Initial situation and motivation

In order to correctly determine the short-circuit current of inverters with Active Front End inverter, i.e. with the possibility of energy feedback into the grid, detailed knowledge of the control strategies implemented in the inverter is required. Of the theoretically possible methods, only a subset is used traditionally, which is usually not adapted to suit the grid. The standard for the calculation of short-circuit currents in three-phase grid (IEC 60909-0) does not currently consider such inverters either.

### Research question(s)

This project aims to model the drive with respect to the short-circuit behavior of the grid and to analyze the different control strategies of the active front-end inverter. Furthermore, an overview of methods used in commercially available inverters will be provided. Based on these studies, a recommendation for the integration of such systems into the short-circuit standard will then be developed. **It is therefore possible to actively participate in one of the world's most important energy standards!**

### Procedure/Methodology/Task definition

The control strategy of the Active-Front-end inverter is analyzed and summarized, the exact mathematical model is created, and the short-circuit current calculation method of the Active-Front-end inverter is derived. After the verification of the offline simulation, the experimental verification can be performed based on hardware-in-the-loop tests on an existing test platform at the institute.

### Organizational matters

**Begin immediately.**

Upon successful completion, the payment of a bonus is planned.

### Contact person / supervisor

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