Applying vector-fitting for modelling modular multilevel converters in the frequency domain

Master and Bachelor Thesis

The system stability of the transmission system depends more and more on the integration of converters into the transmission system due to the higher share of renewables and HVDC systems. Assessing the system stability, in particular harmonic stability, is often done by applying classical control theory in the frequency domain.

Methods for investigating these systems often rely on frequency-dependent impedance models. Such models can be if the converter’s frequency response is given as transfer function. Thus, in this thesis converter models will be models based on approximated transfer functions.

Goals and Focus of the Thesis:
Your focus and core tasks will be:

- Familiarization with methods to analyze signals in the frequency domain
- Implementing methods such as vector fitting for approximating transfer functions on the basis of measured frequency responses
- Measuring converter frequency responses of simulated MMC models as well as the MMC Test Bench. Applying the implemented on the measured data
- Modelling of converter impedance model based on the approximated transfer function

Your Profile:

- Study in engineering, business administration & engineering or computer sciences
- Good skills of English in speaking and writing
- Skills in MATLAB® and MATLAB/Simulink® or similar software (advantageous)
- Skills in FPGA programming advantageous but not necessary

Contact

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Focus

- Vector fitting
- MMC converters
- Transfer functions