

Master's Thesis

Design of a DC chopper for wind turbines

Situation and Motivation

Low Voltage Ride Through (LVRT) capability is an important feature of wind turbines to ensure stable operation even in the event of grid faults. In the event of a deep voltage drop on the grid side, a chopper resistor is activated in the inverter to enable power balancing. This is necessary to prevent an inadmissible increase in the DC link voltage.

Research Issue(s)

The parameters and the control strategy of the chopper resistance mainly determine the LVRT capability of the wind turbines. In this thesis, the hardware of a back-to-back converter shall be modelled in detail and control strategies for the operation of the chopper resistor shall be developed. The control strategy concentrates mainly on the control of the DC link voltage at LVRT.

Procedure/Methodology/Task definition

After defining the model, the optimal resistance value of the chopper is determined in combination with the respective control strategy. The dynamic properties of the system are determined by offline simulation and the system is optimized iteratively. The chopper resistor and the operational control strategy are then installed on the IEAN back-to-back inverter test platform. Finally, hardware-in-the-loop testing is performed to verify the hardware parameters and the control strategy.

Organizational Matters

Begin immediately.

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

Contact person / supervisor

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