

Master's Thesis

Modeling and Control Strategy of a Modular Multi-Level Converter

Initial situation and motivation

The Modular Multi-level Converter (MMC) is often used for high voltage and high power applications due to its low switching frequency, low harmonic content of its output voltage and high degree of modularization. Due to its fast dynamic characteristics, this poses challenges for the stable operation of power supply systems. To investigate the influence of MMC on the power supply system and guarantee stable operation in all states, it is necessary to analyze MMC hardware and control strategy in combination with offline simulation and hardware-in-the-loop test.

Research question(s)

In this thesis the functional principle of the MMC structure shall be investigated. The modulation strategies frequently used in the MMC are compared and analyzed. An optional MMC experimental device with low power and a control strategy suitable for the IEAN laboratory are to be developed.

Procedure/Methodology/Task definition

The functional principle and the control strategy of different MMC have to be analyzed and a mathematical model developed in Matlab/Simulink. Optionally, an MMC experimental device with low power is to be designed and integrated into an existing hardware-in-the-loop test system at the institute.

Organizational matters

Begin immediately.

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

Contact person / supervisor

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