

Master's Thesis

Mitigation of Oscillations in the DC-Link

Motivation

Bidirectional electronic AC-AC or AC-DC converters are frequently split into two parts: a line side AC-DC interface and a load side DC-AC or DC-DC converter. These two functional groups are connected by a DC-link, comprising several energy storing capacitors. In larger power applications, the distances between the two functional groups becomes bigger and the connection lines gain inductance, forming resonant tanks together with the DC-link capacitors.

With higher switching frequencies, enabled by Silicon Carbide based devices, switching may excite oscillations in these resonant tanks. This thesis deals with options for mitigating these oscillations.

Research Questions

- What are the parameters, defining these oscillations in the DC-link?
- How can these parameters be influenced in given (example) configurations?
- Can passive or active damping be used to reduce the amplitudes to acceptable magnitudes?



Tasks

- Literature survey on resonances in DC-link and options for mitigation.
- Sorting and structuring different options.
- Simulation some arrangements and mitigation options.
- Verification of selected mitigation options in experimental setups.

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