



Bachelor's / Master's Thesis

Reduce EMC Noise Level by Design for Future Motion Controllers

Motivation

Motor inverters in principle generate a common mode (CM) voltage which is heavily impacting EMI behavior of the servo drive. Modelling of common mode (CM) voltage in the design phase is essential for evaluating the EMC performance of a servo drive system. The resulting CM voltage at the motor side, however, depends on various parameters (filter topology, PWM modulation strategy, switching speed, etc.) which needs to be evaluated to design the necessary filters for conducted EMI requirements on the AC (grid) terminal.



Research Questions

- Modelling of CM voltage at inverter output up to the 10 MHz range.
- Impact of common mode voltage (CM) on shielded and unshielded motor cables.
- Analysis of different filter topologies on motor side regarding EMC performance.
- Impact analysis of modulation method on CM voltage at the motor side (CPWM, DPWM, etc.)

Tasks

- Literature study on existing modelling methods.
- Development of a sufficiently accurate model and development of a simulation model to investigate CM disturbances for servo drives
- Comparison of shielded and unshielded motor cables.
- Verification of the model by measurements of existing system in the lab.

Further Information

- Start: asap (according to agreement)
- Workplace: EAM Institute TU Graz (Workplace directly at B&R automation possible)

Contact

Univ.-Prof. Dipl.-Ing. Dr.sc.ETH **Michael Hartmann**
Head of Section Power Electronics

Electric Drives and Machines Institute
Graz University of Technology
Inffeldgasse 18, A-8010 Graz, Austria

Tel: +43 (316) 873-**8604**
E-mail: michael.hartmann@tugraz.at
www.eam.tugraz.at

Florian Holzner
R&D Motion Hardware Group leader

B&R Industrial Automation GmbH
B&R Straße 1,
5142 Eggelsberg, Austria

Phone: +43 7748 6586 1246
florian.holzner@br-automation.com
www.br-automation.com