

Master's Thesis

Research of Advanced Protection Mechanisms of Electronic Power Distributors within Vehicular Power Systems

Motivation:

This project subjects the increasing requirements to the power supply of electrified vehicles. Test benches and simulation models have been developed. Current research objectives are directed towards the reliable power supply of safety-critical components for automated driving functions.

About this Position:

Component-specific hard- and software requirements for electronic power distributors should be derived in the early concept phase of the vehicle by means of virtual development methods. Electronic fuses are used for the selective isolation of failures such as short-circuits. This work aims to investigate the switching behavior of electronic fuses and their system-inherent effects within the power system. The existing simulation model includes the wiring harness and the impedances of attached devices. By means of simulation, advanced protection mechanisms of the electronic fuses should be developed, implemented (in both simulation model and hardware) and validated. The result strives for a reliable supply of safety-critical components in case of system-inherent faults or power fluctuations.

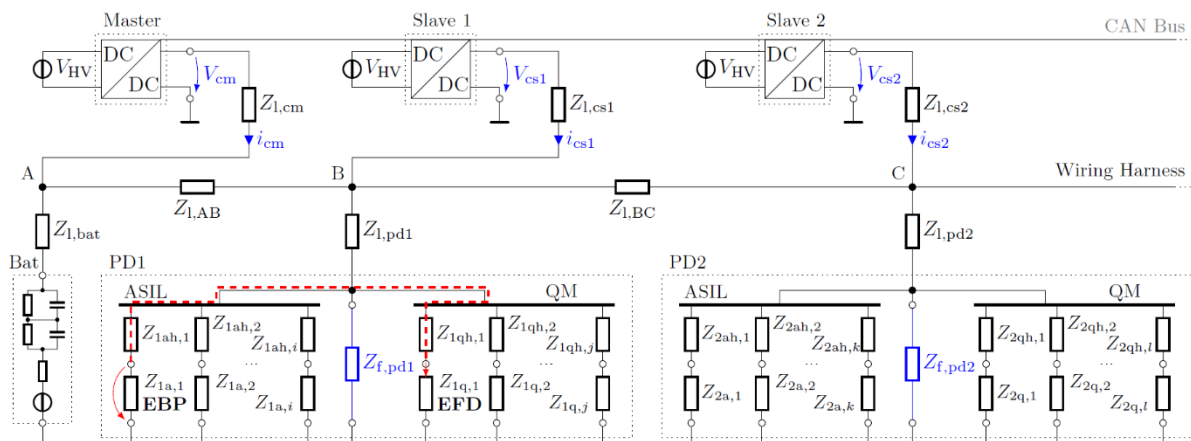


Figure 1: Topology of a vehicular power system. Three distributed converters supply two power distributors (PD1, PD2) with the included safety-critical (ASIL) and non-safety-critical (QM) components.

Objectives and Tasks:

- Modeling and simulation of the automotive power system with electronic power distributors.
- Sensitivity analysis of possible voltage instabilities through switching processes.
- Development, implementation and validation of protection mechanisms.

Requirements:

- Studies in electrical/ mechanical engineering or informatics.
- Knowledge about electrical engineering methods, dynamic systems and control theory.
- Programming and modeling knowledge (MATLAB, Dymola Modelica, Python, C) is desirable.
- Interpersonal and communication skills in both written and spoken English.

How to apply:

Please send your complete application including cover letter, CV, university transcripts and degree certificates to Martin Baumann (martin.bm.baumann@bmw.de, Tel.: +49-151-601-28378)

