Optimal Modulation Methods for High-Power 3-Level Converters in Automotive Drives

This work is conducted in collaboration with Audi AG.

Research Focus

- Classic and modern modulation methods for 3-level converters
- System-level evaluation of 3-level converters performance
- Control of automotive traction drives

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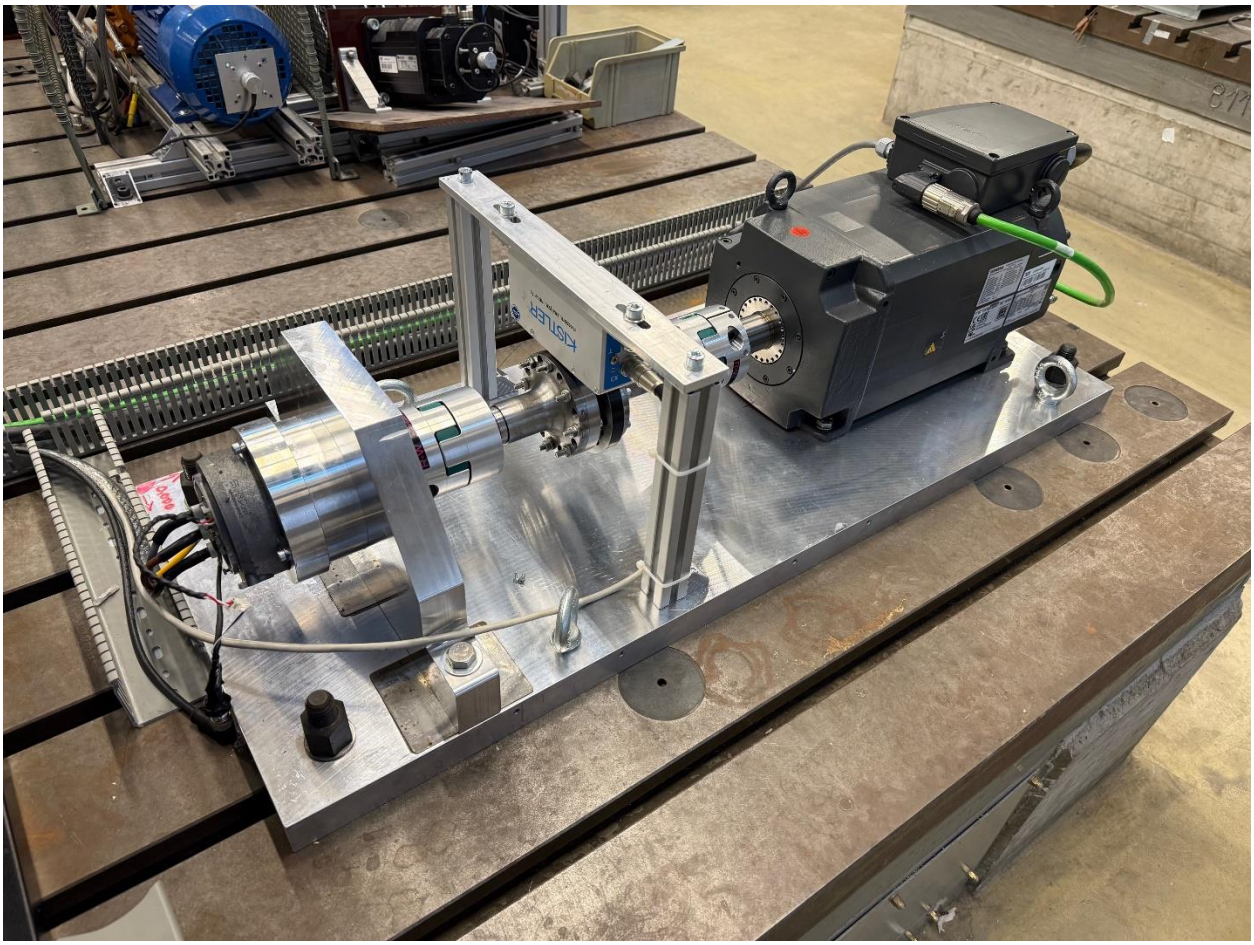
Short Description

It is well-known that inverters can influence the losses in electric machines. Most electric vehicles (EVs) today utilize 2-level traction converters to control electric machines. While semiconductor technology steadily improves, reducing the inverter losses, there is another degree of freedom to also reduce the machine losses. By switching to a 3-level converter topology, the iron and magnet losses in the machine can be reduced. The resulting increase in efficiency can offset the costs of semiconductors and make this concept attractive for EV manufacturers. The implementation of 3-level converters is complex and poses unique challenges such as capacitor voltage balancing and partial-load optimized modulation. This work aims to solve the existing problems and to make 3-level converters viable for automotive applications.

Picture(s)


Antrieb
Load
ON
OFF


KKT
chillers



Publications (none)