Design of a Modular Multilevel Inverter for Traction Applications with Low Voltage Cells

Bakgrund

In vehicle traction applications a 400V batteries with a two-level inverter is commonly used. To increase the efficiency and redundancy of the motor, modular multilevel inverter topologies can be applied. An increase of the power density and redundancy is especially important for vehicle and aircraft applications, as can be seen in Figure 1, which is an excerpt of a joint venture of Airbus and Audi.

![Figure 1 Convertible of the future – flying cab and electric vehicle](image)

Problembeskrivning

Within the frame of this project a modular multilevel inverter for a traction application should be designed. The system should consist of small modules with a battery pack voltage up to 60 V and low voltage MOSFETs. Additionally, an intelligent communication among the battery cells in form of a bus communication should be realized and a fast controller as for example an FPGA/DSP should be used to control the system.
**Målgrupp:** Students from TKAUT, TKELT, TKTFY and TKDAT

**Gruppstorlek:** The project can be conducted in a team of 4 up to 6 students.

**Antal grupper:** 1 to 2 groups.

**Förkunskapskrav:** Prior knowledge of the following courses is recommended but not a must:
- EEK140 Elteknik
- ESS017 Reglerteknik
- EOE054 Mätteknik
- ETI146 Elektronik

**Kontaktperson:** Anton Kersten; kersten@chalmers.se

**Handledare:** Anton Kersten; kersten@chalmers.se

**Examinator:** Jimmy Ehnberg; jimmy.ehnberg@chalmers.se