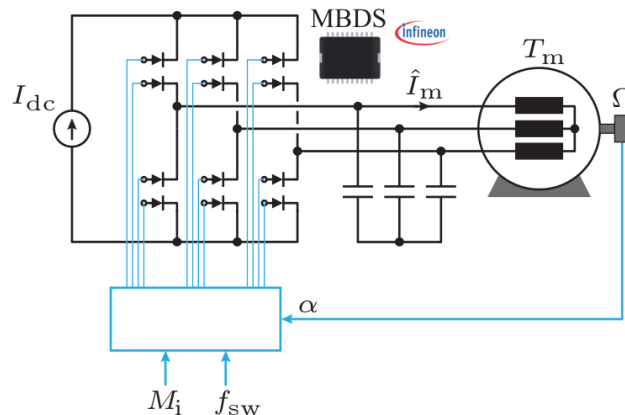


## Bachelor Thesis

### Exploring Modulation Techniques in Current Source Inverters for Future Drive Systems



**Background:** Infineon's breakthrough in the semiconductor domain introduces an advanced monolithic bi-directional semiconductor (MBDS) crafted with cutting-edge GaN technology. This revolutionary semiconductor stands out for its ability to block voltages in both directions, heralding a new era of efficiency and performance. With its unique double-blocking voltage capability, the MBDS finds its perfect match for current source inverters (CSIs). This thesis is an invitation to delve into and unfold the potential of modulation techniques within CSIs, leveraging the prowess of this novel semiconductor.

**Objectives:** This thesis endeavors to grasp the intricacies of CSI modulation techniques and bring them to life within a simulation framework. It's a journey from theory to application, from concept to simulation.

**Approach:** Begin with a robust theoretical examination of the operational principles of CSIs. Progress to a meticulous, analytical understanding of their modulation techniques. The transition from theory to practice by implementing these techniques in a simulated environment culminated in comprehensively verifying the concepts.

**Tools/Software:** Harness the capabilities of MATLAB and PLECS to create a rich, interactive simulation experience.

**Prerequisites:** A foundational understanding of power electronics and drive systems and a keen interest in advancing in this field.

#### Application and Supervision:

Ass. Prof. DDr. Spasoje Miric  
 spasoje.miric@uibk.ac.at