Laboratory for Product Development and Lightweight Design
TUM School of Engineering and Design
Technical University of Munich

Development of a highly energy efficient inverter for an AGV

Semesterthesis / Masterthesis / Forschungspraxis

Robot Systems Group
Laboratory for Product Development and Lightweight Design

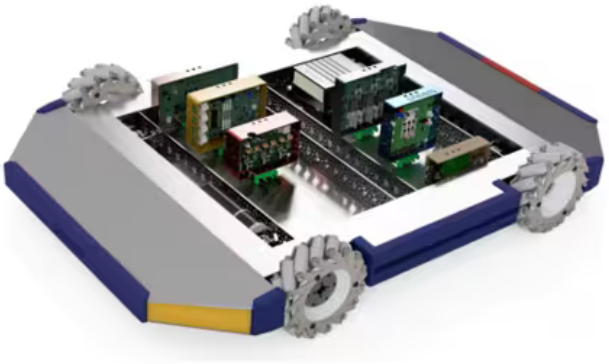

Figure 1 Inverters for an AGV (Source: Arrow)

Project Description: This thesis focuses on the development of a novel, highly energy-efficient inverter specifically designed for Automated Guided Vehicles (AGVs). AGVs are increasingly vital in modern industrial settings, demanding reliable and power-conscious operation. The project seeks to investigate and implement innovative circuit topologies and control strategies that minimize energy losses during motor operation. This will involve analyzing various inverter architectures, selecting appropriate semiconductor devices, and optimizing the control algorithms for smooth torque delivery and minimal harmonic distortion. Additionally, simulations and experimental validation using a real AGV platform will be crucial to assess the inverters performance in terms of efficiency, power factor, and dynamic response. The successful completion of this thesis has the potential to contribute significantly to the advancement of sustainable automation technologies by reducing the energy footprint of AGVs and promoting their wider adoption in diverse industries.

Desired Skills: We are seeking motivated and detail-oriented students with a strong foundation in electrical engineering principles to contribute to the development of a highly energy-efficient inverter for autonomous guided vehicles (AGVs). Ideal candidates will possess hands-on experience with power electronics, control systems, and circuit design. Familiarity with simulation software like MATLAB/Simulink, Eagle or Altium is highly advantageous, as is an understanding of semiconductor device characteristics and thermal management principles. Strong analytical and problem-solving skills are essential for tackling the challenges associated with optimizing inverter efficiency, while effective communication and teamwork will be crucial for successful project completion.

Application Process: Interested candidates should submit their application via email, including a detailed CV and a current transcript of records. Please send your applications to the Email mentioned below.
We look forward to reviewing your background and discussing how you can contribute to this innovative project.

LPL

Datum: 20.01.2025

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