

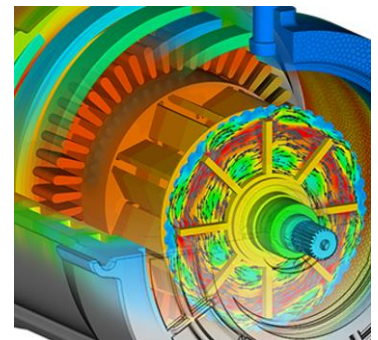
Prof. Malte Jaensch, PhD, MBA
Thermal Management Simulation

Semester Thesis

Simulative Study of the Thermal Management of an Electric Motor

Topic

As power densities increase in electric motors, advanced thermal management strategies become essential to prevent overheating, enhance efficiency, and extend component lifespan. A2MAC1, a leading provider of engineering insights, offers a comprehensive database of vehicle teardowns, providing insights for benchmarking and innovation in powertrain development. This thesis aims to analyse state-of-the-art cooling concepts for electric motors, assess their effectiveness, and predict future trends in thermal management. Using a predefined motor geometry, various influential parameters – such as cooling methods and magnet configurations – will be evaluated through simulation-based approaches.



Work scope

- Review of the state of the art in motor cooling and future roadmap (using the A2MAC1 Database)
- Comparison of different design variations (Oil Cooling vs. Water Cooling etc.) using a predefined model and operation conditions
- Study of the influence of electromagnetic and mechanical design parameters such as copper content, housing design, magnet configuration
- Documentation including recommendations for future work

Qualifications

- Basic understanding of electric powertrains especially electric machines
- Curiosity, willingness to learn, independent thinking, structured approach to problem solving
- Beneficial: Prior knowledge of thermal modelling and simulation
- Fluent in English, fluency in German is beneficial but not essential

Start date / Miscellaneous

Starting now.

Contact

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We are looking forward to receiving your application.