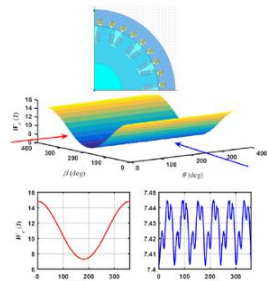


We are the Teaching and Research Area Mechatronics in Mobile Propulsion (MMP). Our heart beats for the technology of tomorrow's mobility. Around the interdisciplinary topics of mechanics, electrical engineering and information technology, we research sustainable and demand-oriented drive and vehicle concepts. We bring the future into drives!

You want to know more about us? Then you will find more information under the following links:

- Who we are
- What drives us
- What we research
- Where we are involved
- How we bring research into teaching



$$W_c(\theta_r, \beta) = \sum_{m_1=-N_1}^{N_1} \sum_{m_2=-N_2}^{N_2} G_{m_1, m_2} e^{j m_1 \omega_\theta \theta_r + j m_2 \omega_\beta \beta}$$

$$W_c(I_s, \beta, \theta_r) = V(\theta_r) C(I_s) U(\beta)$$

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## Bachelor Thesis / Master Thesis

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- ☒ Faculty 1 - Mathematics, Computer Science and Natural Sciences
- ☒ Faculty 4 - Mechanical Engineering
- ☒ Faculty 6 - Electrical Engineering and Information Technology

### Distributed Parameter Modelling for a Dual Three-Phase Permanent Magnet Synchronous Machine

The dual three-phase (DTP) permanent magnet synchronous machine (PMSM) is becoming an increasingly popular choice for many industrial applications due to its high power density and fault tolerance. However, accurately modelling its torque output behavior remains a challenge due to the non-sinusoidal nature of the air-gap magnetic field distribution. The traditional way of modelling electric machines utilizes a lumped parameter model, i.e., an equivalent circuit model, is not the case in reality. Therefore, this thesis will perform finite element modelling for a DTP-PMSM and develop an analytical distributed parameter model based on the magnetic co-energy (MCE) reconstruction to better describe the electromagnetic torque behavior of DTP-PMSM.

Your tasks:

- Development of a FEM DTP-PMSM model to obtain the analytical solution of MCE in different operating points.
- Development of the distributed parameter model based on the MCE reconstruction.

**Would you like to know more?**

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