Institute of Fundamentals and
Theory in Electrical Engineering

Bachelorthesis/Masterthesis

Investigation of Hysteresis Loss Evaluation Methods

Motivation

To design electrical machines, the losses are a very important characteristic to determine the efficiency. Most of the time loss evaluation methods are used in optimization procedures. For this reason, the evaluation has to be very fast and are part of the post-processing. However, they lack the incorporation of the hysteretic effect in the simulation and deal with losses using empirical formulae where parameter have to be estimated first. The state-of-the-art are methods that follow a hybrid approach. This means incorporating the hysteretic effect in the field solution, but doing the actual evaluation in a post-processing step.

Overall Question: What are the most efficient hysteresis loss evaluation methods in literature and can they be made better? What are elegant validation techniques for existing methods?

Learning Goals:

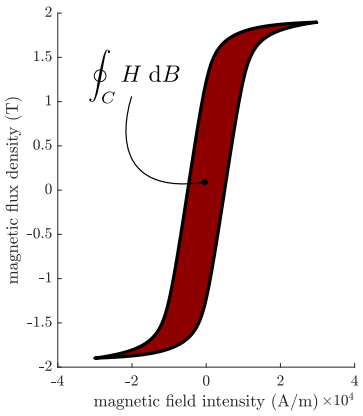
- Get in touch with the finite element method for magnetostatic simulations
- Have a broad knowledge about magnetic loss evaluation methods
- Deepen the understanding of magnetic material behaviour and electrical machines

Tasks

- Literature research (Ferromagnetic material laws, loss evaluation, electrical machines, finite element method)
- Mesh certain types of electrical machines
- Execute magnetostatic finite element simulations
- Validate different loss evaluation methods

Organisation

- Language: English
- Start: Immediately possible



Contact/Supervisor

Lukas Domenig
Inffeldgasse 18/I
lukas.domenig@tugraz.at