Bachelor thesis

TECHNISCHE UNIVERSITÄT DARMSTADT

Fachgebiet Elektrische Antriebssysteme

„Design and implementation of an iron core hysteresis loop measurement system using ring shape specimen “

Background

The iron core of an electric motor exhibits highly complex magnetic properties, mainly reflected in its hysteresis loop. Accurate characterization of these properties is critical for electric motor simulations, as the quality of the material parameters directly affects simulation accuracy. This thesis focuses on the design and development of a measurement setup for acquiring the hysteresis loop and magnetization curve of a ring shape iron core specimen from around 50Hz to 1kHz.

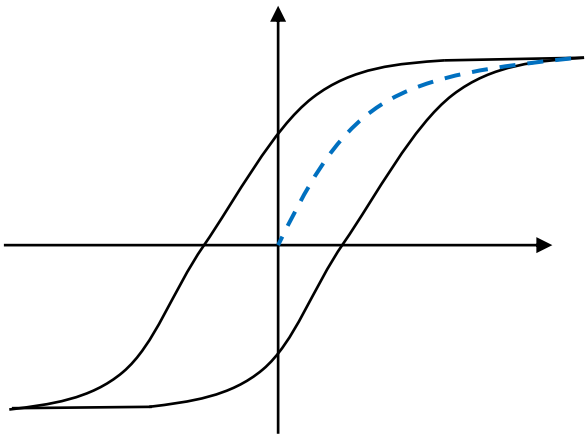

Figure 1 Hysteresis loop of Si-steel lamination

Task description

- **Literature Study:** Review and understand magnetic material test procedures in compliance with IEC 60404.
- **Experimental Design:** Design and implement a test system that meets the requirements of the relevant standards.
- **Data post-processing:** Process and analyze the measurement results; where possible, apply mathematical models to describe and interpret the measured data.

Requirements

Basic knowledge of electric motors, especially the principle of iron losses, knowledge of measurement of electronic system is helpful.

Dates and organization

Processing period: **2026**

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