Masterarbeit/Master Thesis

„ FEM Simulation of Eddy Currents in layered Materials "

About us

CTR Carinthian Tech Research AG is an industry-oriented research and development center for smart sensors and system integration. As the largest non-university research center in southern Austria, CTR has gained a reputation for expertise in R&D sensor technologies serving science and industry at both a national and international level. CTR focuses on four main research areas: Microsystem Technologies, Packaging & Hetero-integration, Photonic Sensor Systems and Smart Systems. In the Austrian COMET program, CTR features with "ASSIC Austrian Smart Systems Integration Research Center" as a K1 center of excellence.

Short description

When oscillating magnetic field penetrate metallic objects eddy currents are generated that distort the original field. Modern automotive speed sensor systems employ magnetic sensors to determine the oscillation of the magnetic field resulting from the rotation of a wheel. Simply by placing the sensor in the setup, the magnetic field is distorted by eddy currents that develop inside the sensor.

It was shown by advanced analytical methods how eddy currents that develop in thin layers influence the magnetic field on the outside. While the analytical model relies on a simplified physical picture where an AC current loop lies on top of a layer, it can be assumed that similar physics is sampled in a typical wheel speed sensor setup where a rotating cogwheel generates the oscillation of the magnetic field.

Tasks

Based on previous works, the Master Student will implement a speed sensor system in an FEM-environment to analyze the influences of eddy currents. The data obtained from the simulation will be analyzed in detail using a state of the art scientific Python environment – providing the student with the opportunity to learn how modern FEM simulation (ANSYS) and data analysis (Python) are conducted.

Previous studies have shown that interesting, even counter-intuitive effects are expected. Working the results into a scientific publication is the aim if the student shows excellent skill and workmanship.

Start Date / Duration / Contract

Start date (planned): the position is immediately available
Contract: We offer you a salaried position including all related rights and duties for employer and employee. The position will be time-limited according to the duration of the master thesis
Duration (planned): 6 months
Place: Villach, Austria

Profile / requirements

- Master Student in Mathematics, Physics, Electrical engineering, Mechatronics or similar
- Knowledge of and interest in Electromagnetism
- Interest in scientific programming (data analysis, numerical methods, visualization)

Application: www.ctr.at/en/application or www.ctr.at/bewerbung

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