TUM Hyperloop
TUM School of Engineering and Design
Technical University of Munich

Design and Simulation of a Linear Reluctance Motor

Type:	Master Thesis
Content:	theoretical / simulative
Possible start:	01.04.2025
Key words:	electric machines, finite-element simulations, reluctance forces

TUM Hyperloop

Our group is researching Hyperloop technology for passenger transport. We focus on electromagnetic levitation, suspension, and propulsion, simulation of high-speed aerodynamic phenomena, cooling systems, and vehicle structure and infrastructure topics. Depending on the topic, we work on new test benches and the implementation of various experiments, computationally intensive simulations, or the design of new types of components. Our chair aims to motivate you and other students to develop modern technology for tomorrow – together as a strong team with the power of everyone.

Job Description

Reducing the amount of permanent magnet material in electric machines is one of several objectives to lower costs and reduce material waste. Therefore, in rotating but also linear machines reluctance motors are gaining more interest. Here, we want to design and simulate a linear reluctance machine for high-speed applications with a completely passive track and an active electromagnetic component on the vehicle. The major goal of this investigation is to maximize the thrust force while minimizing the attracting force between rotor (vehicle) and stator (track).

Your Tasks

- Researching and understanding the working principles of different reluctance machines.
- Conducting parametric electric simulations in finite element software.
- Derive a preliminary design for a linear reluctance motor.

Our Requirements

- Being familiar with the working principles of electric machines.
- Experience with or willingness to learn to operate new software.
- High motivation with enthusiasm to make an impact.
- Perseverance to finish tasks on time.

Our Offer

- Working with students and researchers in a highly motivated young research team.
- Experience in a new field of research which is gaining in importance.

Contact

If you are interested in working with our team, please send your application, motivational letter, and supporting documentation to Tim Hofmann (tim.hofmann@tum.de). If you have any questions, do not hesitate to contact us.