ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

swissloop

euroTUBE

Analysis and Simulation of a Control Strategy for Levitating Linear Induction Motors

Short Description

Global rise in mobility brings traditional modes of transport to their limits. Vacuum Transportation enables an efficient and safe way of transport. Vehicles, so-called pods, travel at high speeds on a rail through a low-pressure tube in order to minimize drag.

ETH Zurich's Hyperloop Team Swissloop participated with other university teams in Elon Musk's Hyperloop Pod Competition for three consecutive years. While so far the focus has been maximum acceleration for the competitions, Swissloop aims to shift research focus on more viable prototypes. This approach includes the development of components that achieve the required performance, but also work reliably and safe.

The goal of this thesis is to investigate control strategies for levitating Linear Induction Motors (L-LIMs) and develop a robust control strategy. An existing LIM will be used as a framework and simulations of the results should demonstrate the applicability and performance. Additionally, the strategy should be applicable to the LIM and inverter system provided by Swissloop.

The results of this thesis aim to enable magnetic levitation for future pod prototypes. These motors will be incorporated into pods. This thesis is conducted at the Institute ??? in collaboration Swissloop.

Type	Semester thesis
Partner	ETHZ, Swissloop
Start date	tbd
End date (planned)	tbd
Student(s)	tbd
Internal supervisors	Nathalie Nick, nathalie.nick@swissloop.ch Yvan Bosshard, yvan.bosshard@swissloop.ch
External supervisors	???

Work packages

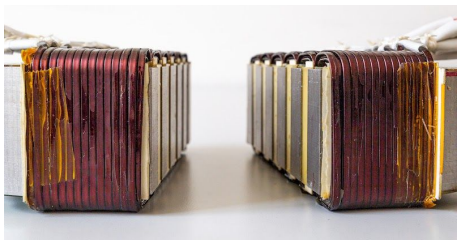
- Literature review of LIMs and Control Strategies
- FEM Simulation of the motor (electro magnetics)
- Development of a control strategy
- Simulation of the control strategy (MATLAB/Simulink, Simplorer, etc.)
- Possibly implementation on the provided system
- Documentation and writing of report

Requirements

- High motivation and interest in the topic
- Able to work independently and be creative
- Experienced in control theory
- Basic understanding of electromagnetism
- Basic skills in Simulation (MATLAB/Simulink, Simplorer, etc.)

Application

Please email your CV and transcript to tbd



Linear Induction Motor of the 2020 Swissloop Pod

Swissloop Pod *Claude Nicollier* (2019)