Bachelor/Semester/Master Thesis:

TUM Hyperloop Levitation and Guidance System Control



TUM Hyperloop:

TUM Hyperloop is developing a full-scale Hyperloop demonstrator including a fully functional vehicle with a levitation system, a propulsion system and a vacuum tube. For the work on the magnetic levitation system control, we are looking for a motivated student who would like to write a bachelor, semester or master thesis within the TUM Hyperloop team.

https://www.lrg.tum.de/en/flr/research/projects/tum-hyperloop/

Thesis Description:

As part of the Levitation sub team you will work on the control algorithm for the pod magnetic levitation and guidance system. With this algorithm, the position and attitude of the pod within its guideway will be regulated. The thesis work package will comprise system analysis, simulations and physical testing, including the following aspects:

- Analysis of the multi-body vehicle levitation and guidance system model including model reduction, linearization, stability and robustness analysis in temporal and Laplace spaces.
- Sensor positioning, modelling and analysis of required sensor quantity by examining the observability of the states.
- Controller and observer design and parameter optimization for levitation and guidance system.
- Investigation of system behaviour under load deviations, guideway misalignments, measurement noise and system latencies with the help of dynamic simulations.
- Verification of stability, robustness and mechanical configuration with a small-scale physical test setup.

You will be part of the TUM Hyperloop Team with more than 70 people working on the future of transportation. Take the challenge!

Requirements:

- Advanced user of Matlab and Simulink
- Interest in mathematical modelling, control theory and its implementation in practice
- Experience with physical tests, experimental data processing, analysis and evaluation as well as fieldbus protocols, such as EtherCAT preferred
- Highly motivated Master or Bachelor student preferably of electrical engineering background
- Independent work and planning
- Analytical way of thinking
- Team player

Our offer:

- Working in a young and dynamic team aspiring to change the way we travel
- Hands-on experience building the first European full-scale Hyperloop demonstrator

Contact:

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