

The Institute of Applied Dynamics (LTD) at Friedrich-Alexander Universität Erlangen-Nürnberg is offering at the earliest possible time a student thesis.

Inverted pendulum experiment

Bachelor/Project/Master thesis

The inverted pendulum is often used as an example in engineering. It can be controlled in its unstable equilibrium position, the dynamics of a pendulum can be observed, or optimal upswing trajectories can be obtained with optimal control methods. The latter is the goal of the experimental setup designed and built in this thesis. The experimental setup has to be updated to a belt driven two-axial inverted pendulum using 3D design and 3D printing. The new stepper motors have to be actuated and controlled via a microcontroller for a successful upswing for the pendulum. As a final step a control strategy for an optimal upswing, based on optimal control, has to be implemented.

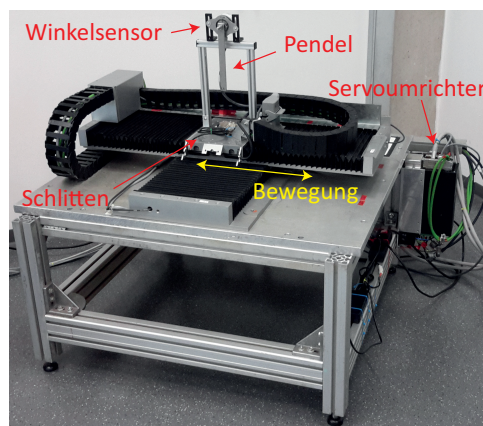


Figure 1: Setup of the inverse pendulum with one axis actuated by a linear motor.

Necessary qualifications

- engineering studies (mechanical, electrical, or similar)
- basic 3D design and programming skills
- fluent in either English or German
- interest in combining practical and theoretical elements

Additional qualifications (not necessary)

- experience with Matlab and Simulink
- experience with rapid prototyping or 3D printing

If you are interested send your CV and transcript of records to simon96.heinrich@fau.de.