With 11,500 employees worldwide, AVL is the world's largest independent for the development, simulation and testing of powertrain systems (hybrid, combustion engine, transmission, electric drive, batteries, fuel cell and control technology) for passenger cars, commercial vehicles, construction, large engines and their integration into the vehicle.

We offer a master thesis:

Simulation of a truck on a powertrain testbed
With focus on dyno inertias

Most of the heavy-duty trucks sold in Europe are equipped with automated transmissions. The calibration of the transmission control unit (TCU) is mainly responsible for the drivability behavior of the vehicle. This calibration task is currently done in a high number of maneuvers on test tracks. A powertrain testbed (PTTB) can help to reduce this calibration effort. On a PTTB the tires of the truck are replaced by e-motors where the speeds and torques of the e-motors (dynos) are controlled with the help of a vehicle model to enable real loads on the powertrain without moving the vehicle. However, one difficulty of the powertrain testbed operation is to ensure real loads on the powertrain for the performed maneuvers. Especially for dynamic maneuvers with fast changing wheel speeds the loads at powertrain testbed could differ from the real loads due to higher inertias of e-motors compared to the real tire inertias. Within this thesis it should be investigated based on simulations which inertias are required for defined maneuvers.

TASK

- Get familiar with an existing simplified simulation model of a PTTB (Matlab/Simulink)
- Replacement of some simplified Matlab/Simulink models with more detailed models
- Implementation of some typical vehicle maneuvers used for truck TCU calibration
- Simulation runs on the defined maneuvers and variation of the dyno inertias
- Comparison of simulation results of a standard vehicle and the PTTB simulation model

STUDY

- Mechatronics engineering
- Control engineering
- Vehicle engineering

IRT-Ansprechpersonen:

Martin Steinberger
Markus Reichhartinger

REQUIREMENTS

- High interest in modeling and simulation of dynamic systems
- Good knowledge of control engineering (PI-controller, etc.)
- Knowledge of MATLAB Simulink
- Basic knowledge of vehicle and powertrain modeling

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