



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 hybrid components

The development of new electric/hybrid powertrains require a lot of effort in testing of the new hardware and software parts. With the help of a powertrain testbed (PTTB) this tests can be performed in an automated and reproducible way. On a PTTB either the whole vehicle or just the powertrain itself is mounted. Instead of tires, the powertrain is connected to e-motors (dynos) where the speeds and torques are controlled with the help of a vehicle model to enable real loads on the powertrain. Considering hybrid components on PTTB, the battery is typically replaced by a battery emulator. The overall system including mechanic powertrain (transmission), hybrid parts (e-motor and inverter), energy storage device (battery emulator), dynos (incl. dyno control) and testbed control is getting quite complex. Therefore, in this thesis a simulation model should be developed to enable investigations on different control parameters and limitations of the testbed.

TASK

- Get familiar with an existing simplified simulation model of a PTTB (Matlab/Simulink)
- Adaption of the simplified conventional powertrain to a hybrid powertrain
- Modeling of the e-motor(s) and the battery emulator incl. controls
- Implementation of some typical maneuvers
- Simulation runs on the defined maneuvers and investigation on different controller settings
- Comparison of simulation results of a standard vehicle and the PTTB simulation model

STUDY

- Mechatronics engineering
- Control engineering
- Electrical 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

