

## Student thesis



Master thesis

# Energy-efficient strategy for force distribution in vehicle

## Topic and Goal of the Thesis

The Institute of Automotive Engineering Aachen develops, designs and realizes the research vehicle SpeedE. This vehicle has a wheel-individual steer-by-wire front wheel suspension, which also allows high wheel steering angles of up to 90°. In order to achieve new maneuverability possibilities, an active wheel-individual steer-by-wire rear wheel steering system is to be integrated in the SpeedE. This will provide more degrees of freedom than necessary for the plane movement of the vehicle. The degrees of freedom gained through overactuation can be used for additional goals such as energy efficiency or safety.

In the context of this work, the goal of energy efficiency is to be pursued. For this purpose, a concept for the energy-efficient distribution of tire forces is to be developed. Different approaches are to be developed and tested that take different energy consumers into account. For this purpose, the current vehicle model is to be extended by selected energy consumers. The different approaches will be tested in the IPG CarMaker simulation environment and subsequently evaluated.

## Working Points

- Literature research,
- Familiarization with the vehicle model,
- Listing and weighting of energy consumers,
- Modeling of selected energy consumers,
- Design of different strategies,
- Simulation and evaluation of the approaches,
- Discussion of the results.

## Department

Vehicle Dynamics & Acoustics

## Contact



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## Language

German or English

## Entry Date

Earliest possible date

## Prior knowledge

Vehicle dynamics, Matlab/Simulink, Control theory