

## Announcement for Master/Bachelor Thesis Project

# Analysis and Prediction of Systematic Tire Slip Based on Machine Learning

### Motivation

Maneuvering vehicle-trailer combinations is a widespread problem in logistics. Depending on the configuration of the vehicle combination, it is essential to support the driver. System modeling plays a crucial role in the realization of complex maneuvers. Highly accurate models complicate controller design and system identification, while simple models do not adequately represent system behavior in all driving situations. Therefore, hybrid modeling approaches based on machine learning are becoming more and more interesting.



Source: [ipg-automotive.com](http://ipg-automotive.com)

### Task description

In this Project, the slip effects of a vehicle-trailer combination in various driving situations are to be investigated. In certain driving situations the axles of the vehicle combination enter a state with a high slip angle. The aim of the work is to investigate the slip behavior in terms of its reproducibility and systematics. The focus is on the influencing factors of loading condition, terrain properties, rigid axle connections and vehicle velocity.

The simulation environment TruckMaker is used as the reference model, which is compared to a kinematic model that is able to represent slip effects. Then, data based models like neural networks or Gaussian processes can be used to represent these influences.

### Requirements

- Lecture: Machine Learning
- First experiences in Matlab programming

### Contact

Julian Dahlmann, M.Sc.  
Chair of automatic control  
[julian.dahlmann@fau.de](mailto:julian.dahlmann@fau.de)