Head:	Dr. Anastasios Kouvelas
Topic:	A new analytical model for car-following with vehicle dynamics
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Registration:	www.ivt.ethz.ch/en/studies/downloads/assignments.html#registration

Car-following models are designed to describe the longitudinal movement of vehicles. They are used in microscopic simulation studies. They are meant to be lightweight and easy to implement. A major downside is that they do not always respect realistic vehicle dynamics. For example very sharp (unrealistic) accelerations or decelerations might appear after calibration. This project aims to tackle this downside by suggesting a new model that uses a generic analytical function that ensure a better reproduction of realistic dynamics upon calibration.

The tasks can be defined as follows (dependent on final format/group size):

- Understand how car-following models operate (strengths and weaknesses)
- Study the MFC vehicle dynamics model (https://co2mpas-driver.readthedocs.io/en/latest/)
- Identify an analytical function to describe the acceleration dynamics
- Incorporate this into an existing model (Model 1), e.g. Intelligent Driver Model
- Calibrate Model 1 and the new Model on data and compare

Links:	-
Additional remarks:	Group work possible
Minimum credits:	9 / 11 or 24 ECTS (depending on project/thesis)
Recommended lectures:	Road Transport Systems (Verkehr 3), Transport Systems, Traffic Engineering
Additional information:	Good skills in Python and basic optimization understanding are required.