Optimization of Vehicle Powertrain Model Complexity for Different Driving Tasks

The Swedish National Road and Transport Research Institute (VTI) has an opening for one or two master thesis students at the Vehicle Technology and Simulation unit (FTS). The objective of the master thesis is to investigate needed vehicle powertrain model complexity during different driving tasks.

VTI and FTS

VTI is an independent and internationally prominent research institute in the transport sector. Its principal task is to conduct research and development relating to infrastructure, traffic and transport and its operations include all modes of transport. VTI has about 200 employees and is located in Linköping (head office), Gothenburg, Stockholm, Borlänge and Lund.

FTS conducts research in the area of driving simulation, vehicle dynamics, tire characteristics, driver assistance and active safety systems. FTS has several unique equipment including three driving simulators and a test rig to measure the tire-road friction.

Background

Environmental impact from vehicles has been a hot topic during the recent years. To reach the set environmental goals several new technologies have been introduced to the market, e.g. hybrid cars. With new technology comes an increased need of test methodology, preferably early in the development process.

One proven way of testing and evaluating various vehicle systems is driving simulation. In a collaboration between VTI and Linköping University a unique platform for distributed powertrain co-simulation has been developed. Within a driving simulation a driver environment can be constructed freely, typically with the goal to be as realistic as possible. However, in real-time simulation it is not always possible to have a physically correct and complete model and developers always face the tradeoff between model fidelity and computing power.

Work outline

The main goal of this work is to try to give a good answer to the question “We want to run this driving simulator experiment where the driver is supposed to …, which model do we need?”. As tools, the VTI driving simulators and Linköping University vehicle lab will be available. The following tasks are included:

- Literature reading on the topic
- Classification of driving tasks
- Performing vehicle measurements
- Creating models with different complexity
- Conducting a simulator study
- Writing and presenting conclusions

The thesis work is planned to start in January 2015 and is located to Linköping. Note that this thesis work is performed in cooperation with the University and is only open to students from Linköping University.

Qualification

- Engineering background within the areas of control and signal processing, vehicle dynamics or a similar area
- Experience of programming and simulation in Matlab/Simulink and C++
- Ability to work independently and to take initiatives
- Enthusiasm for problem-solving
- Adequate driving experience
- Language proficiency: fluent English is a must and Swedish is meritorious

Application instruction

Deadline: Dec 31, 2014
Send your application with CV to: sogol.kharrazi@vti.se

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