AVL is the world's largest privately owned company for development, simulation and testing technology of powertrains (hybrid, combustion engines, transmission, electric drive, batteries and software) for passenger cars, trucks and large engines.

**Thesis work – Automatic Transmission Shift Quality**

**Background**
Synchronized gear shift quality is a major contributor to improving the driver comfort of modern vehicles. It is more important than ever that the improvement in shift quality follow the improvements of other areas of vehicle comfort developments. However, evaluating improvements in shift quality is often difficult due to the fact that shift quality is opinion-based, and can vary a lot from driver to driver. There is therefore a need to develop reliable and repeatable methods to characterize shift quality, using either objective measures or traditional rating techniques.

**What**
The purpose of the thesis is to use a model-based approach to evaluate the shift quality of an automatic transmission (powershift) in a heavy duty powertrain.

**How**
- Conduct a literature survey on how to define shift quality for different vehicle types
- Create a simplified model of a complete vehicle powertrain
- Create a more detailed model of the vehicle transmission
- Analyze the propagation of torque through the transmission during down-up and up-down shift
- Evaluate how variations in torque and clutch slip affect the shift quality
- Propose technical solutions to assess, measure and improve the shift quality
- If possible, the model should also be used to deliver a shift quality rating based on already recorded CAN bus measurements from an actual vehicle

**When**
Autumn 2014/spring 2015

**Tools**
Matlab/Simulink

**Candidates**
Suitable candidates are M.Sc. students within mechanical engineering, vehicle engineering or engineering physics with a good understanding of modelling and simulations, and an interest in powertrain development.

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