Embedded Systems with Simulink (FWP2-SS17)

Simulation and Developing of an Automotive Electronic Control Unit, suitable for EI and EM

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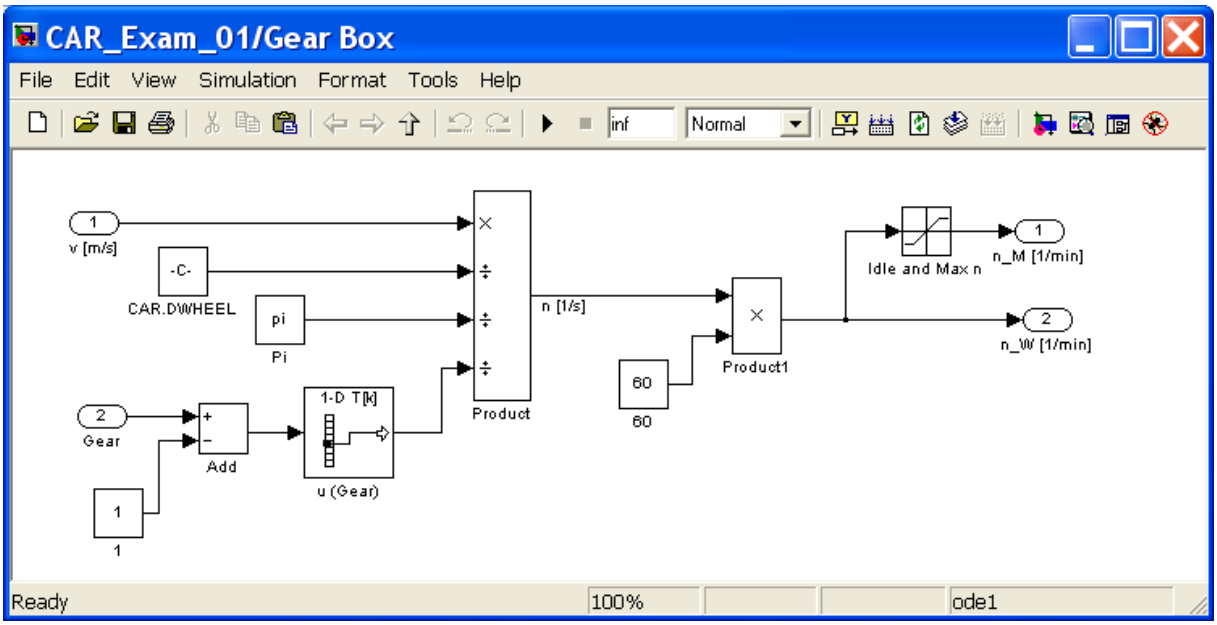
The objective of the class is to learn how to simulate and develop embedded systems with Matlab/Simulink. You will be introduced in the basics of simulation and the tool very carefully step by step via the simulation of interesting examples like ”The stratosphere jump (Felix Baumgartner 2012)”.
Generally the development of an embedded system can be divided into the 3 steps **modeling**, **simulation** and **code generation**.
These 3 steps will be demonstrated via the development of an automotive electronic control unit (ECU). The key aspect of the lecture is the development of a simple car model as well as the modeling of a gear- and clutch-logic for an ECU with Matlab/Simulink. From this model we will generate C-Code automatically. The generated code will be flashed on a microcontroller board and intensively tested via a dSpace-rapid-prototyping-system. This is exact the way how the development of ECU is done by companies like BMW, Airbus, etc. The practical part will take more than 50% of the class.
Preconditions: willingness to get familiar with Matlab/Simulink, basic knowledge of physics and having fun on (virtual) driving.