



ME41115 HW01 deadline 2017 0519

Vehicle Dynamics B – Vehicle Control (Technische Universiteit Delft)

ME41115 Vehicle Dynamics B – Vehicle Control

Homework #1 – Due 19-05-2017

Note: PID controller will suffice for this assignment. The application of another control methods or benchmarking between them is highly appreciated.

- 1) install Delft-Tyre software and use the provided template
- 2) Design a wheel slip controller. The selection of control method is according your preferences.
- 3) Simulate the designed wheel slip controller in the following conditions:
 - type of surface wet asphalt $\mu = 0,6$;
 - a braking manoeuvre starting after 2 sec of free rolling;
 - starting from 120 km/h until the speed of 5 km/h.Setting of the reference wheel slip κ_{ref} should be done to achieve the shortest possible braking distance.
- 4) Design a mixed slip-deceleration (MSD) controller. The selection of control method is according your preferences.
- 5) Simulate the designed MSD controller for the same manoeuvre as in point 3. Set ε to achieve approximately the same slip was reached in the case of wheel slip controller.
- 6) Consider the noise to both wheel slip and wheel deceleration. Download the noise signals (noise_HW01.mat) from blackboard. Re-simulate the controllers of point 2 with noise and compare with the simulation of the designed MSD controller. Report the braking distance for both controllers in the Table.
- 7) Prepare and upload via blackboard compressed file named “yourname_student#_HW1” containing:
 - a pdf document with the clear description of your answers (any assumption that you made, block diagrams, equations, figures and results analysis).
Page limit is 6 pages excl. title, contents, references and appendixes.
 - Simulink realization with a well commented initialization file (it should be possible to run the simulation and see the most important plots by simply executing a single script)
 - **Export your Simulink model to Matlab2015b.**