



KON-C2004 - Mechatronics Basics, Lecture, 22.10.2024-12.12.2024

This course space end date is set to 12.12.2024 [Search Courses: KON-C2004](#)

/ Department of Mechanical Engineering / Sections / Week 1 / 1.3 Simulink warmup - 7 points

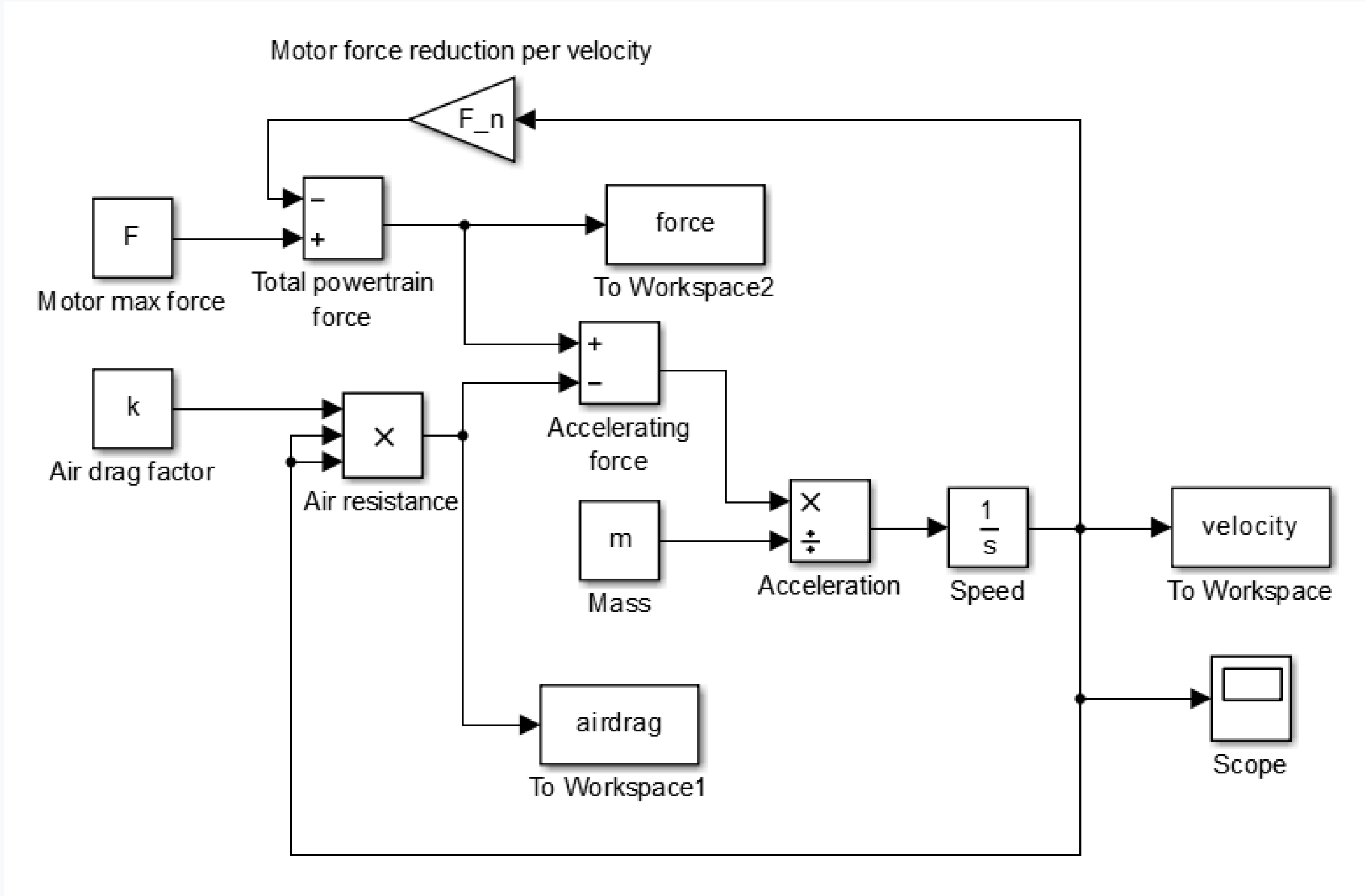
1.3 Simulink warmup - 7 points

Opened: Tuesday, 15 October 2024, 10:00 AM
Due: Tuesday, 29 October 2024, 10:00 AM

Create a Simulink model according to the image of a model below. The model simulates an electric car during a full acceleration from standstill. Run the model and plot the speed of the car [km/h] as a function of time. Plot also one figure displaying the force produced by the powertrain [N] of the car and the opposing force of airdrag [N] as a function of time.

Write a short report where you describe in a couple of sentences why the speed of the car and the air drag behave as they do. Write also the equation for the velocity of the car. You can "read" the implicit equation from the simulation model. Submit the report as a .pdf file into the box at the bottom of this page. Include also the figures in the report, including a figure of the simulink model. Return also the model file with a name exercise1.slx and the plotting script you used. Do not compress them to a .zip file. The report should be comprehensive enough, so that the task can be graded based on only the report. The matlab files are checked only if there seems to be a small mistake in the code. Any tool can be used for PDF-report generation: Matlab report generator, word, latex etc.

Set the maximum time step of your solver to 0.1 s in the Simulation/Model configuration parameters menu in Simulink. Use a 30 second simulation time. Use 30 seconds also as the timescale of the plots. Simulation time can be changed in the small field on the right side of the simulation button in Simulink model window.



Use the .m-file, provided below, to initialize the variables for the model and for plotting the velocity and force curves. First, run the first section ("Run section" button in the Matlab editor) to initialize the parameters in the Matlab/Simulink workspace. Then run the Simulink model you built. After that you can use the third section of the script to make the plots from the data the simulation produced. If the .m-file does not seem to work, ensure that you have adjusted the settings as shown [here](#).

You can find instructions for using Simulink in the "Simulink for Beginners" document. More help is available at the Thursday's exercise session. You can download Matlab/Simulink to your own computer from [download.aalto.fi](#).

The blocks used in this model are "Constant", "Gain", "Sum", "Divide", "Product", "Integrator", "To Workspace" and "Scope". They can be found in "Commonly Used Blocks", "Continuous", "Math Operations" or "Sinks" libraries in Simulink Library Browser. You can modify the block properties by double clicking it in the Simulink model window.

Maximum 7 points.

 [Intro_to_Simulink.m](#)

7 October 2024, 10:12 AM

Submission status

Submission status	No submissions have been made yet
Grading status	Not graded
Time remaining	Assignment is overdue by: 118 days 23 hours
Last modified	-

Previous activity

◀ 1.2 Electrics Basics - 9 points

Next activity

Solutions for exercise round 1 ▶

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