Homework Assignment - UGV Waypoint Simulation

Due date : October 1, Monday, 2018

Problem 1. [10 points] In the lecture on Sep 19, 2018, we introduced you to the simulink model (Fig. 1) of our small UGV.

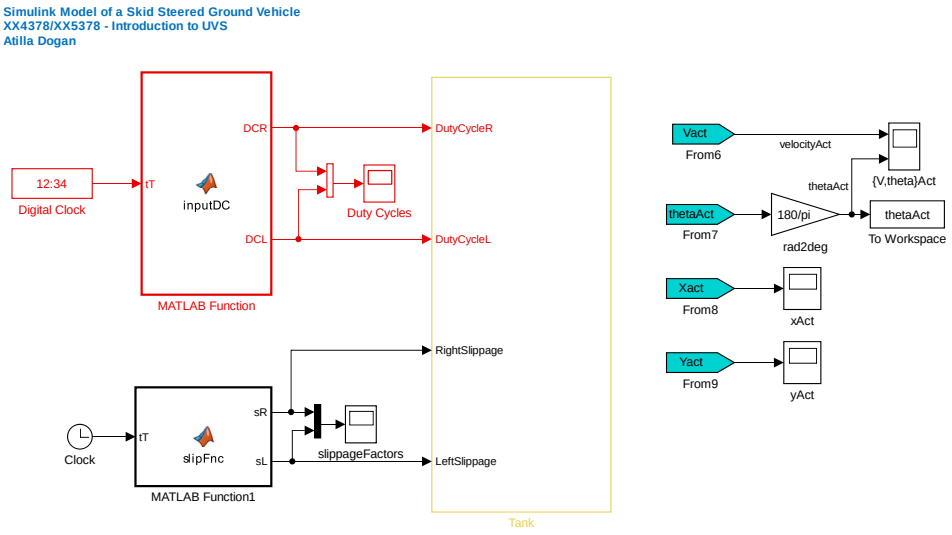

Figure 1: Top level of the UGV simulink model

The motion of the UGV is controlled by two input signals:

1) Duty Cycle of the Right Wheel (DutyCycleR)

2) Duty Cycle of the Left Wheel (DutyCycleL)

In simulation, these two input signals can be assigned in the red "MATLAB function" block. In this homework assignment, you need to schedule these input signals for the UGV to move through four way points as shown in Fig. 2. Starting from the origin, the UGV should visit waypoints at (3,-3), (4,1) and (6,1) in this order and then go and stop at the last waypoint at (1,3). A waypoint is considered visited if the UGV enters the blue circle centered at that waypoint.

The simulation and accompanying files are already posted in blackboard along with the presentation slides from Sep 19. You are allowed to modify only the code in the red "MATLAB function" block to schedule the input signals, and the simulation end time. You should not

modify the simulink file in any other way. You also need to enter these wayPoints in parameterVehicle.m file. When the simulation stops, the path of the UGV during the simulation will be plotted along with the waypoints like Fig. 2.

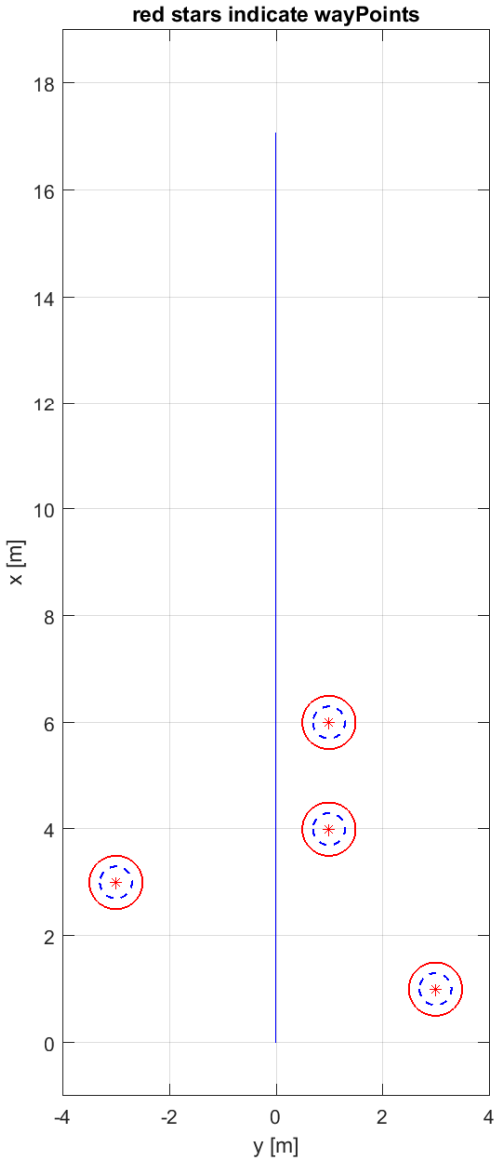

Figure 2: Way Points for the UGV to visit

You should submit to blackboard a zip-file containing (1) your modified simulink model and the parameter file, (2) a snapshot of the "Duty Cycles" scope showing how the input signals are scheduled, and (3) a copy of the figure plotted at the end of your simulation showing the path of the UGV going through the first three waypoints and stopping at the 4th one.