ELEE 4200/5200: Autonomous Mobility Robotics
Term I, 2019
Homework 2: Drive Robot with Feedback

Guidelines:
- Due date: Thursday, September 26, 2019 by 12 Noon.
- You are permitted to work in groups of no more than two students. State the full names and T# of the students in the group on the cover page of every document that you submit. Only one report needs to be submitted per group!
- Submit the report by responding to this assignment posting in Blackboard. The submission should at least include the following documents, bundled together into a single zip file with the name *YourNameHW2* (use one of the group member's names).
  - The main report in 'pdf' form (using the LaTeX template provided).
  - The MATLAB program code (as an m-file, so that it can be executed!).
  - Support documents like videos, etc.
- A separate hard copy (printout) of the 'pdf' report with MATLAB code listing; staple all pages together and follow the TA's instructions on how to submit the hardcopy.
- Each group must work on its own in completing this assignment! Feel free to consult with others in developing solution ideas, but the final code implemented must be your work product alone. Refer to the Syllabus, where the policy on academic integrity is clearly outlined, our classroom discussions on this topic, and consult with me and/or the TAs if you have any questions!

Broad Goal:
The aim of this assignment is to go one step beyond Homework 1 by driving the robot using feedback to guide it. Drive the robot along a triangular path that is an isosceles triangle with angles of 30^0, 120^0 & 30^0, with the equal sides being 5 meters each in length. To do a triangle you will need to use a stop-turn-go strategy. In the initial investigations do not attempt to close the triangle, if it is not closed!

Specific requirements:
a) Investigate how you can get a reading of time in your programming environment (and briefly explain this in your report).
b) Use timing to drive the robot along the sides of the triangle and turn through the necessary angles. ($\Delta s = v*\Delta t$; $\Delta\theta = w*\Delta t$)
c) Repeat, this time driving using odometry feedback.
d) Repeat by using the "model state" topic as feedback, instead of odometry.
e) Comment on the various paths traced and compare them.

<u>Note:</u>

- In any assignment there are always parts whose details are not exactly specified and I am not referring here to missing information that should have been provided. In such situations you can ask the TAs or Instructor for hints, but you are generally expected to use your creative abilities to complete what is necessary. This is how one develops one's abilities!
- An issue that you may have to consider – drive fast or slowly, turn fast or slowly?
- Use the references on MATLAB-ROS provided in Homework 1.