ID6040: Introduction to Robotics

Programming Assignment 3 - Differential Kinematics

Due on 4th April, Morning 9 AM

Total marks: 7

Refer to the instructions provided here (https://github.com/BijoSebastian/ID6040Assignments) to set up the simulation.

For the 2 DOF planar manipulator, compute the joint angle rate to achieve end effector motion along task space. The manipulator end effector starts on top of Goal 2 and is required to go to Goal 3, by moving along task space X axis at a speed of 0.01m/s. Compute the joint angle rates required for achieving this motion. See the file robot_params.py for link length and complete the differential kinematics calculations in the file differential_kinematics.py

1. Once you have completed the differential kinematics implementation, launch Coppeliasim. Click on File->Open Scene, navigate to the downloaded setup, and select the file "2R_manipulator.ttt". Run the simulation by clicking on the light blue play button.

3. Launch Spyder. Click on File -> Open and navigate to the downloaded setup. Select the file Assignment_3.py. Run the file by clicking on the green play button.

4. Always ensure that the simulation is running before you launch the code, otherwise you will get an error that says "Failed connecting to the remote API server. Program ended".

5. If your implementation of the differential kinematics calculation was correct, you will get a printout on your terminal that says Exercise 3 result: Success

Submission details:

Upload the completed differential_kinematics.py file along with a report on the differential kinematics calculation that you implemented on Moodle as your assignment submission. Take a screenshot of 3 trials of the simulation with the exercise result as success and add to your report. Upload both as a single zip file to Moodle.

1. You are not allowed to use any python packages other than the ones already defined in the files.
2. Type the report explaining your solution in Word or Latex and upload in PDF format.
3. Do not upload pictures of handwritten notes.
4. -0.5 marks for late submission on the same day, -1 marks per day for late submission after the due date