

ENSC488: Introduction to Robotics
Simon Fraser University, Fall 2016
Demo 3 (Final Demo)

Group #:
Member 1:
Member 2:
Member 3:

Lab Project Final Demo Instructions

Materials to be submitted:

- This page with the name and student no. of your group members written at the top;
- Dynamic equations of motion for your manipulator with all the terms clearly expressed.
- Block diagram of the project with all the sampling time values clearly indicated.
- Final project report; See section 4 of project description for details on what to include in the report.

Demonstrations:

Your program should demonstrate the following:

- **Fix bugs from Demo 1 and 2:** Make sure you have fixed earlier problems such as joint limits, multiple inverse kinematics solutions, etc. If you do not, it will hamper your demo 3 as well.
- **Dynamic Simulator Only:** Using the emulator, show the behavior of your robot dynamic simulator under constant torques/forces applied to the joints. For instance, you could apply a torque of $(1,0,0,0)^T$ and show how the robot responds. You should be able to predict the qualitative behavior.
- **Trajectory Execution:** Execute a planned trajectory (e.g., similar to the one you generated in Demo 2) using your controller and simulator and display it using the emulator.
- **Plotting:** Plot the planned trajectories (position, velocity and accelerations), and the controller output (torques) and the simulator outputs (actual joint positions/velocities/accelerations, respectively) that result from executing the planned trajectory on the same time scale; Note that the trajectory planner, controller and simulator have different sampling periods. Please make sure that your “plotting” is automatic, ie a single command/keyboard input should generate the plots for the executed trajectory; you should not be editing code for each run as new files are generated.

- **Please note that since the demo is on the emulator only, you can demo on your laptop. If you would like to use the 488-lab computers, make sure you have compiled and tested your code on those machines well in advance of the demo date to avoid last minute compilation/version issues.**