RBE 500 – Group Assignment – Part 3

This assignment is about moving the robot on a linear path.

1) (4 pts) Velocity Level Kinematics: Implement a node with two services. One takes joint velocities and converts them to end effector velocities, and the second one takes end effector velocities and converts them to joint velocities.
2) (4.5 pts) Write velocity controllers for all the joints (again, for tuning the controller gains, you might need to fix the joints other than the joint of consideration; if you do that Don't forget to revert the joint type to movable, once you are done tuning).
3) (1.5) Give a constant velocity reference in the positive 'y' direction of the Cartesian space. Convert this velocity to the joint space velocities using your Jacobian and feed it as a reference to your velocity controllers. This should make the robot move on a straight line in the +y direction. Record the generated velocity references together with the actual velocity of the system over time, and plot via Matlab. Record a video of the robot moving on a line and include in the report (please be sure to shrink the video size so that it does not create submission problems).

Write a report about your implementation. The report does not have to be long, but it should explain all the steps of the implementation. Copy-pasting the code and the results is not enough. Submit your report together your node.