Deliverable 1)

As expected, when the arbitrary torque vector of .1 Nm is applied across the robot, the movement of the robot is very chaotic with its manipulators swinging around wildly. This is not unlike all other similar simulations we have done in the past when we apply torque vectors with a controller.
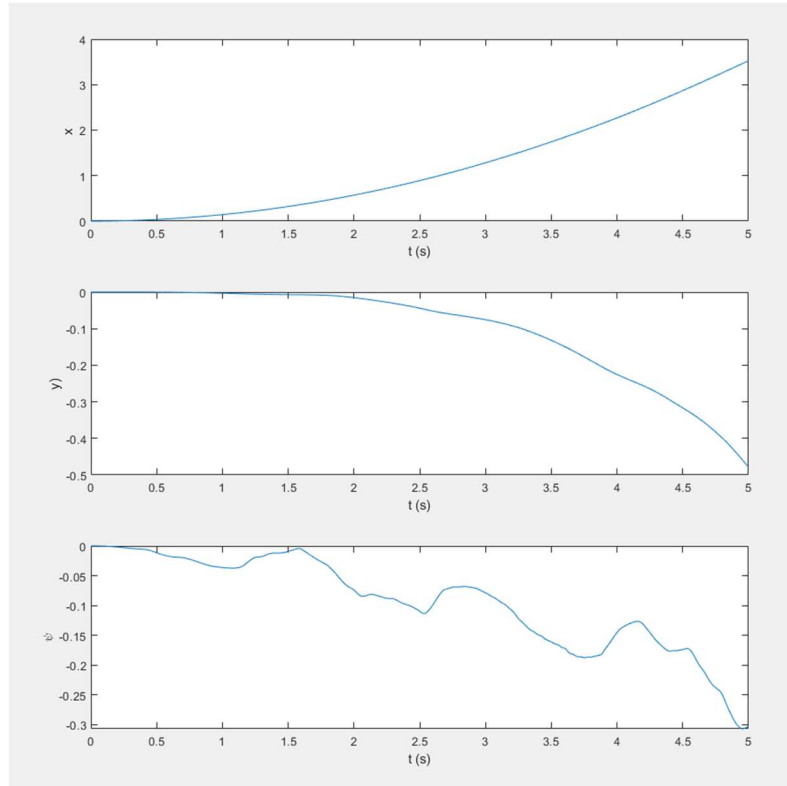

Figure 1: X, Y & Psi of the Mobile Robot

The figure above plots the X & Y positions of the robot along with the orientation of the robot Psi. Since arbitrary torque vectors were even applied across the robot, rather than moving in a straight line the robot began turning as moved. This is likely due to the chaotic nature of the manipulators when torques are applied without a controller.
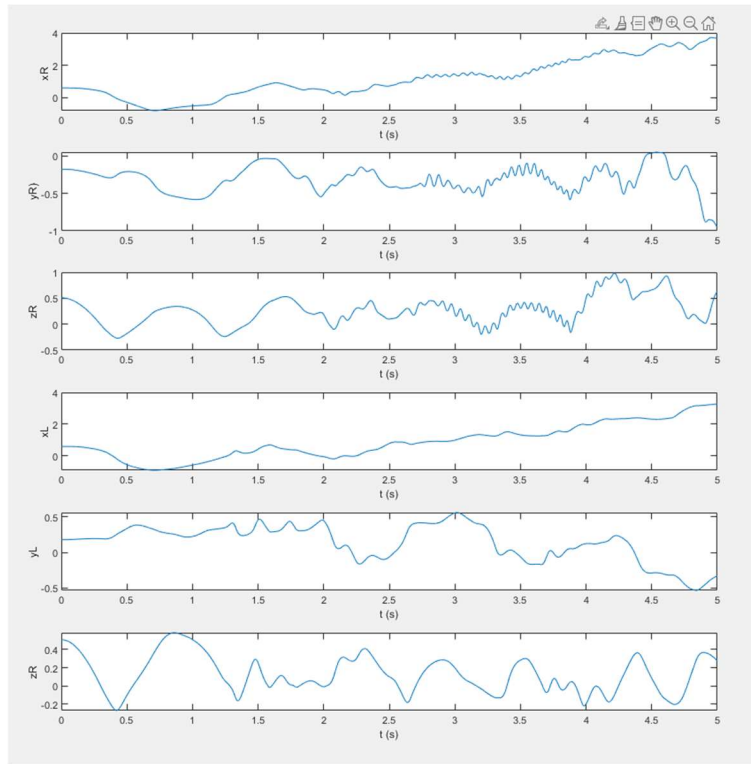
Figure 2: X,Y, & Z positions of the left & right end effectors.

When a controller is not implemented on the manipulator of the robot, this system becomes very chaotic. This is not unlike any of the homework as when we simulated robots without controllers, they would move in the same chaotic way.

Deliverable 2)

The desired points of the manipulators are as follows:

$$\prescript{I}{I}{r}_{ER} = \begin{bmatrix} -0.0516 \\ -0.2011 \\ 0.9088 \end{bmatrix} \text{X, Y, Z Position of the right end effector}$$

$$\prescript{I}{I}{r}_{EL} = \begin{bmatrix} -0.0516 \\ -0.2011 \\ 0.9088 \end{bmatrix} \text{X, Y, Z Position of the left end effector}$$

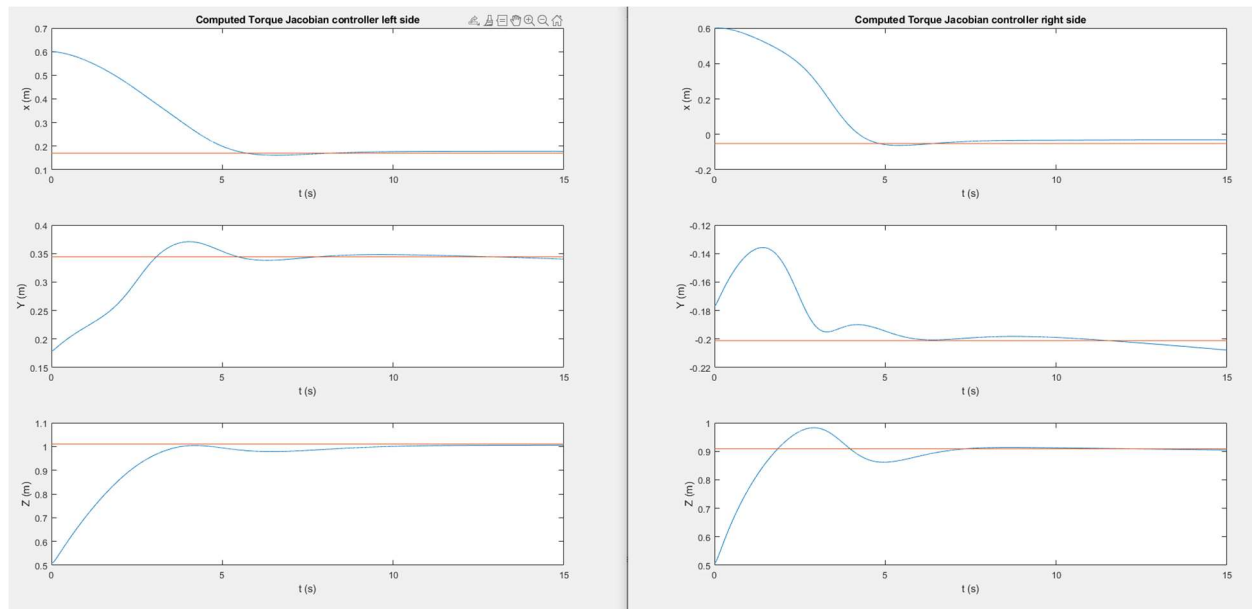As you can see from both the graph and video, the robot is able to successfully converge on a desired point within 10 seconds.

Figure 3: Left and Right End Effector X, Y, and Z positions