In this exercise you will learn how to implement model-based control on a single link of the manipulator you built. Assemble one link to a motor and an optical encoder. Implement a simple Proportional-Derivative (PD) controller and a joint-space computed torque method controller on the single link. Implement your model in Autolev and develop a simulation of the movement of your mechanism when acted upon by these controllers. Compare the theoretical prediction to the actual motion of the mechanism.

Write up this lab as a homework problem including the development of the equations of motion by hand. Make sure to include:

1. A clear discussion of how you translated the mass properties from Solidworks into your model in the Mass Properties section of the write-up.

2. Clearly show how the gear transmission and motor properties appear in your model.

3. Include a listing of the input file to Autolev, along with a listing of the .all file.

4. Include a listing of the simulation code generated by Autolev.

5. Include a motion capture plot of the animation of the simulated data.

6. Overlay the simulation and experimental data for joint angle versus time on a single plot and include it in the Solution section.

7. In the Solution section, give a brief discussion of the comparison between the theoretical prediction and the experimental motion.

8. In the Solution section, include a picture of your team next to your device.