MAE C163C / C263C Mini-Lab #1

*(Due via Gradescope by **11:59pm on Friday, 4/25**)*

Mini-Lab #1: Hands-on Dynamixel motor tutorial

1. PID control – Building intuition

A PID controller involves a proportional gain K_P, integral gain K_I, and derivative gain K_D. Describe the effects of individually increasing each of these terms while keeping the other two constant.

2. PID control – Analysis of time history plots

a) Choose three distinct sets of proportional K_P, integral K_I, and derivative K_D gains. Each gain (K_P, K_I, and/or K_D) must be nonzero for at least one set of gains (small gain values are acceptable for the K_D term). **Create a table containing the three distinct sets of gains chosen.**

Set	K_P	K_I	K_D
1			
2			
3			

b) **For each set of distinct gains,** provide an **individual plot** of motor angle (in degrees) versus time (in seconds) generated using the Dynamixel hardware and Python code in *minilab1.py*. All plots should have axis labels, a title, and a red dashed line at the set-point/reference of 90 deg.

c) **For each of the three plots**, explain why the corresponding choice of gains results in the system time response displayed in the plot.