Demonstration 2

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1. I tuned my gains by adjusting the three PID values until the system was barely overdamped, to minimize the response time and minimize overshoot.

Ref\_speed = 300

# 2pi rad = 2\*pi in

run\_time = 12/(ref\_speed/45)

commandTimes = [     0,   0,   0,   0,   1,         1+run\_time\*1.05, 6+run\_time, 6+run\_time\*2\*.975 ] # Time to send command

commandData  = [OLgain,  Kp,  Ki,  Kd,   ref\_speed, 0,          -ref\_speed,0 ] # Value to send over

commandTypes = [   'f', 'P', 'I', 'D', 'c',       'c',        'c' , 'c'] # Type of command to send

Chart, box and whisker chart

Description automatically generated

There was a slight error in that it would take longer for it to reach operating speed on lifting versus descending, as pwm had to run higher and it took longer to reach the pwm.

Gains

# EDIT HERE START #

# OL Gain

OLgain = 0.5 # [PWM/(rad/s)]

# Closed loop gains

Kp = 0.6   # Determine units

Ki = 0.6   # Determine units

Kd = 0.004  # Determine units

ref\_speed = 300 # rad/s change as needed