

Prelab 4 for AAE364L Fall 2020

September 26, 2020

The lab manual for this experiment (lab 3) can be found at:

<https://engineering.purdue.edu/AAECourses/aae364L/Spring-2015>

In the Lab 3 experiment manual. The lab manual will have helpful information in completing your prelab. The simulink files can also be found at the above link. The simulink files you will need to complete the prelab are described in the lab manual in the appropriate section.

1 Pre-Lab for the integral controller (Part (iii) in the manual). Due at the beginning of the lab experiment. You will not be allowed to run the lab experiment with out a complete pre-lab.

- i. Hand in your best values for the state gain K that you computed from Simulink using **LQR method**, as well as your A_i and B_i matrices
- ii. Hand in the plots of position and angle from the simulation for a square wave response. The lab experiment will use a Pulse Generator, with an Amplitude of .2m, a Period of 20 seconds, a Pulse Width of 50%, and a Phase Delay of 15 seconds. The simulation is ran in the lab for 59 seconds.

NOTE: Make sure to set the pendulum type in the matlab files to PEND_TYPE = 'LONG_24IN'

You CANNOT use gains that have a magnitude greater than 200, i.e. $|k_x| \leq 200$ for $x = 1, 2, 3, 4, 5$