College of Engineering
School of Aeronautics and Astronautics

AAE 36401 Lab
Control Systems Lab

Lab 5 Pre-Lab
The Control of the Inverted Pendulum

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The gains using Pole Placement:

K_1	K_2	K_3	K_4	K_5
-76.5544	91.0760	-37.9289	18.5217	94.4953

The gains using LQR:

K_1	K_2	K_3	K_4	K_5
-49.9747	156.3945	-45.5208	36.5653	31.6228

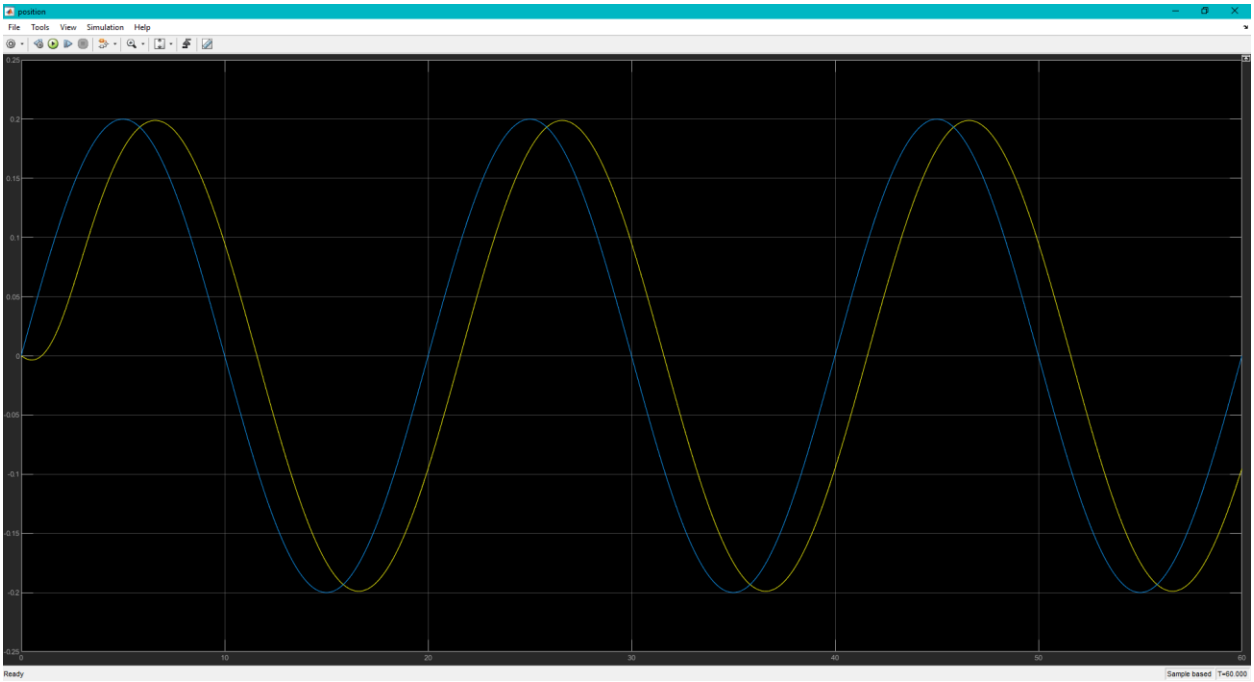
The poles for Pole Placement:

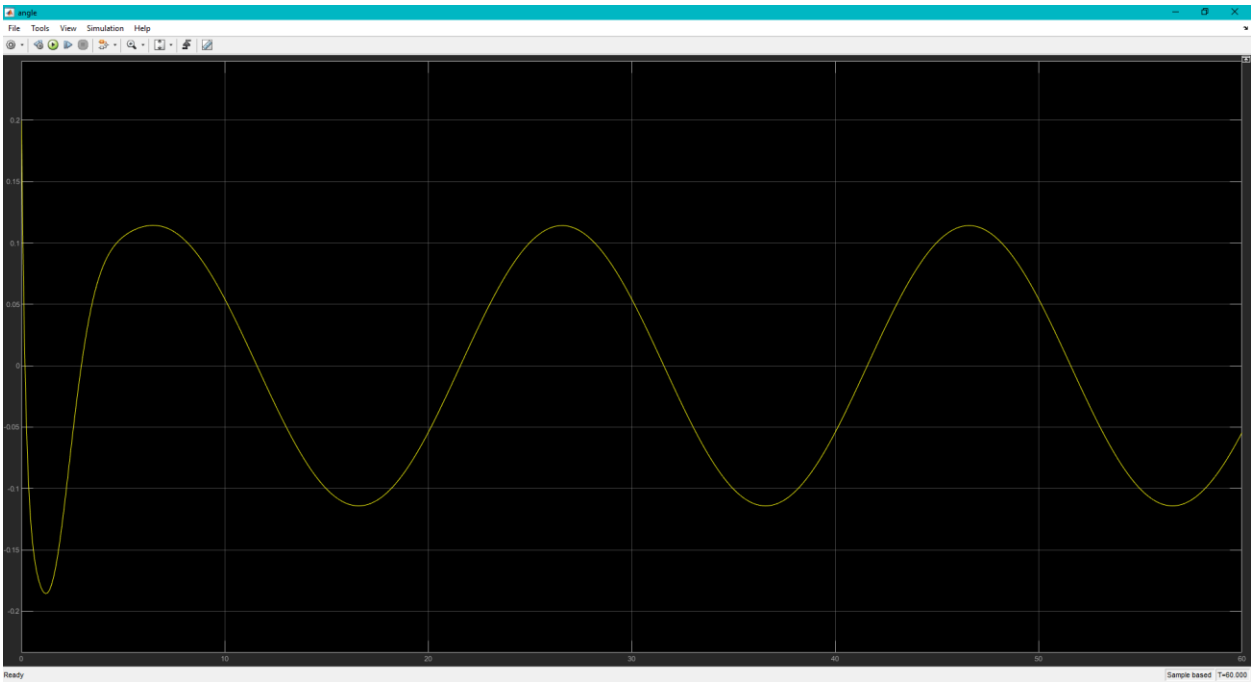
λ_1	λ_2	λ_3	λ_4	λ_5
-5+3.5i	-5-3.5i	-3+4.5i	-3-4.5i	-3

The poles for LQR:

λ_1	λ_2	λ_3	λ_4	λ_5
-64.3972	-2.0915 + 1.3698i	-2.0915 - 1.3698i	-1.2125 + 1.1168i	-1.2125 - 1.1168i

Plot for LQR


position
File Tools View Simulation Help
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
0 10 20 30 40 50 60
Ready
Sample based T=60.000


angle
File Tools View Simulation Help
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
0 10 20 30 40 50 60
Ready
Sample based T=60.000

Plot for Pole Placement