Practice Final Exam – Simulation Results

ECEn 483/ ME 431

Fall 2014

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

At the end of the exam, print this file and staple it to the handout portion of the exam.

# Part 1. Equations of Motion – Simulation Model

1.3 Insert plot of the output of the simulation model with sinusoidal torque input directly below this line.

# Part 2. Design models

2.2 Insert plot of the output of the simulation model with initial condition  and input directly below this line.

# Part 3. PID Control

3.6 Insert a plot that shows both and when is a square wave with magnitude degrees and frequency 0.1 rad/sec, and when using a PD controller.

3.7 Insert a plot that shows both and when is a square wave with maginitude degrees and frequency 0.1 rad/sec, and when using a PID controller.

3.8 Insert the Matlab code for ctrl\_pid.m that implements PID control directly below this line.

# Part 4. Loopshaping

4.3 Insert a plot showing simulation results for a lead compensator below this line.

4.5 Insert a plot showing simulation results for a lead-lag compensator below this line.

4.6 Insert the Bode plots for the original plant, the lead-controlled plant, and the lead-lag controlled plant below this line.

# Part 5. Observer-based control

5.5. Insert a plot of the step response of the system when the true state is being used.

5.6 Insert a plot of the state estimation error when the true state is being used.

5.7 Insert a plot of the step response of the system when the estimated state is being used in the controller.

5.8 Insert a copy of ctrl\_est.m.

# Part 6. Loopshaping

6.3 Insert a plot showing simulation results for a lead compensator below this line.

6.5 Insert a plot showing simulation results for a lead-lag compensator below this line.

6.6 Insert the root locus plot for the lead-lag compensator below this line.

# 7. Insert your param.m file here.