AERO 7970/7976 Multivariable Control of Uncertain Systems (3)
Summer Semester 2019

Homework 1

Assigned May 28, 2019
Due June 10, 2019

Reading assignment

Review the reading material that covers the lectures until May 28.

Problem

Design a control system using frequency shaping for the following system:

$$G(s) = \frac{10}{(s+1)^2}$$

To satisfy the performance requirements:

1. Steady state error to a unit step = 0
2. -40 dB attenuation in the frequency range [0.01 – 0.1] rad/sec
3. -40 dB attenuation in the frequency range [100 – 1000] rad/sec
4. Bandwidth of about 10 rad/sec
5. Phase margin of 30 degrees

Use the sensitivity frequency response in the design and find a stable complex function W(s) that incorporates the performance requirements.

Describe your work accurately, and show your results numerically and graphically using Matlab.

Your work should include: sensitivity frequency response, time response to a unit step, controller transfer function, closed loop system

Include any other tool used for the design.

You can either upload the homework in Canvas or email it to me.