AE353: Design Problem 01 Rubric

A. Faustino T. Bretl

January 23, 2019

The final reports for Design Problem 01 will be assessed with the following rubric:

(10%) Draft Reports

- (5%) A draft that includes, at minimum, the goals and model sections was submitted by 11:59PM on January 30.
- (5%) A draft that includes, at minimum, the zero input and state feedback analysis sections was submitted by 11:59PM on February 6.

(20%) Final Report

- (10%) It was submitted by 11:59 PM on February 8.
- (10%) It is the correct format.
  - It has the correct document type (article), the correct font (computer modern, the default) and font size (12pt), and the correct margin (1.0in).
  - It uses 8.5x11 paper.
  - It has a title, author, and date.
  - It is exactly four pages.

(20%) Code

- The script `Test.m` successfully runs your simulation and is consistent with what the report says was implemented.

Your code *must* run without error (i.e., the simulation figure always says `CONTROLLER: ON`). **No attempts will be made to debug your code.** If it does not run without error, you will receive 0% for this portion of your grade.

(50%) Requirements

- (10%) Goal
  - (5%) It reflects an understanding that angular velocity is a vector, not a scalar.
  - (5%) It specifies all three components of angular velocity—or, if it specifies fewer than three components, it gives a reason.
- (10%) Model
  - (2.5%) The nonlinear model is presented, and is correct.
  - (5%) All steps of linearization are presented, and are correct.
  - (2.5%) The resulting linear model is presented, and is correct.
- (10%) Zero input
  - (2%) Correctly define what zero input means for this system.
  - (3%) Determine if the linearized system with zero input is asymptotically stable.
  - (3%) Plot the results of applying zero input.
  - (2%) Comment on whether the plotted results confirm or deny your prediction about asymptotic stability.
- (10%) State feedback
  - (2%) Correctly define what state feedback means for this system.
  - (3%) Determine if the linearized system with state feedback is asymptotically stable.
  - (3%) Plot the results of applying a state feedback controller.
  - (2%) Comment on whether the plotted results confirm or deny your prediction about asymptotic stability.
- (10%) One of the following things
  - Examine the differences, if any, between predictions made by your linear model and by the nonlinear simulation.
  - Examine how the initial conditions affect the resulting motion, if they do at all.
  - Design and implement a method of reference tracking.
  - Design and implement a method of disturbance rejection.
  - Determine the extent to which the stated goal ("achieve some particular angular velocity") is even possible.

Peer Review

In addition to the above requirements, you will be asked to submit two peer reviews. Failure to submit one peer review will lower your report grade by 5%. Failure to submit both will lower your report grade by 10%. Further details will be posted to Piazza.