**AME 30315; Spring 2014; Homework 8; Due March 26th, 2014**

*Read: 9.0 – 9.4*

*Problems:*

- **Problem 1:** 9.1. You can use Simulink instead of a custom written program. Show your Simulink diagram and/or code for full credit. You should be referencing a plot for every item requested in the problem.

- **Problem 2:** Consider the feedback control system shown in Fig. 1.

  (A) Design $k_p$ and $k_d$ such that the poles of the transfer function $Y(s)/R(s)$ equal $-2 \pm 3i$.

     Predict the overshoot and rise time of the time-domain response. Simulate the response to a step reference signal using Simulink. Does the simulation match your prediction?

  (B) Next design $k_p$ and $k_d$ such that the poles of the transfer function $Y(s)/R(s)$ equal $-4 \pm 6i$.

     Predict the overshoot and rise time of the time-domain response. Simulate the response to a step reference signal using Simulink. Does the simulation match your prediction?

*Fig. 1. Feedback control system for Problem 2.*