EE 327 Signals and Systems 1
Homework 7
7 Points

1. Plot the pole positions of the following first-order systems. What is the final value of the output to a step input? Sketch the step response.

   a. $H(s) = \dfrac{20}{(s+2)}$

   b. $H(s) = \dfrac{0.5}{(s+0.5)}$

2. Plot the pole positions of the following second-order systems. What is the final value of the output to a step input? Determine ζ, ω_n, the percent overshoot (if applicable), the time constant, and the settling time. Determine if the following systems are under damped, critically damped, or over damped. Sketch the step response.

   a. $H(s) = \dfrac{10}{s^2 + 15s + 50}$

   b. $H(s) = \dfrac{10}{s^2 + 20s + 100}$

   c. $H(s) = \dfrac{10}{s^2 + 10s + 100}$

3. Use MATLAB to generate the step response of the following systems. Find the rise time and percent overshoot (if applicable).

   a. $H(s) = \dfrac{20}{(s+2)}$

   b. $H(s) = \dfrac{10}{s^2 + 10s + 100}$

4. From the following step response plots, determine the transfer function. Also, determine the rise times.

First-Order System

Second-Order System