ECE 463/663 - Homework #1
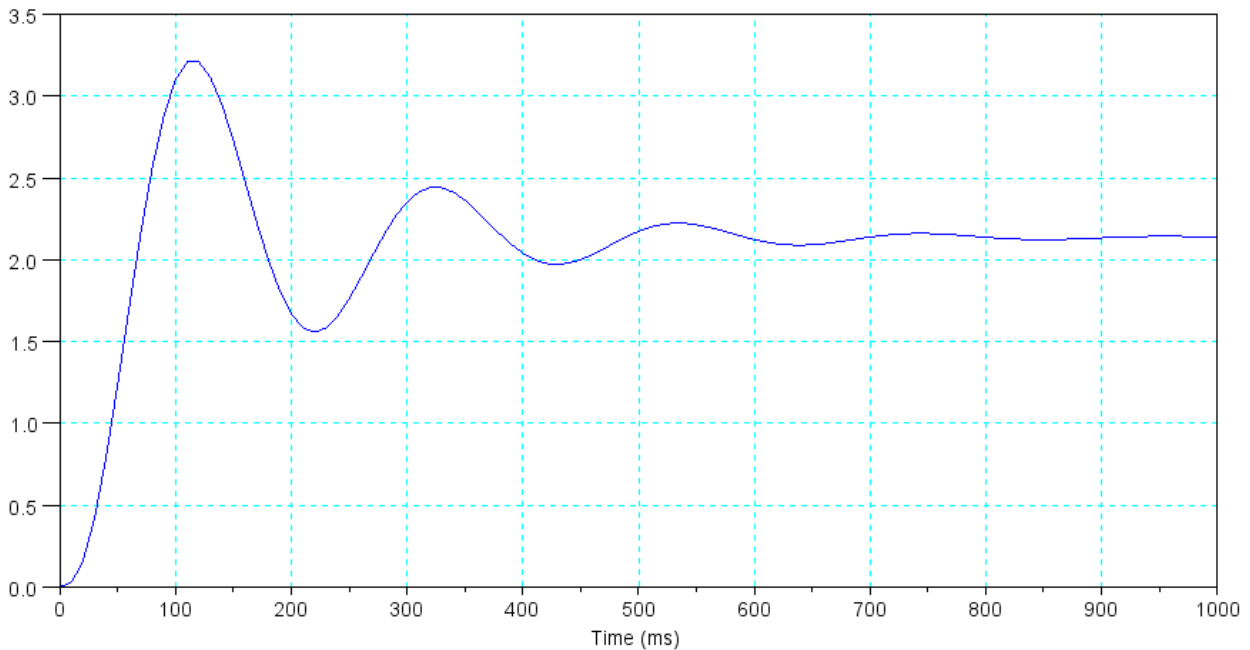
LaPlace Transforms and Dominant Poles. Due Wednesday, Jan 19th

1) Name That System! Give the transfer function for a system with the following step response.
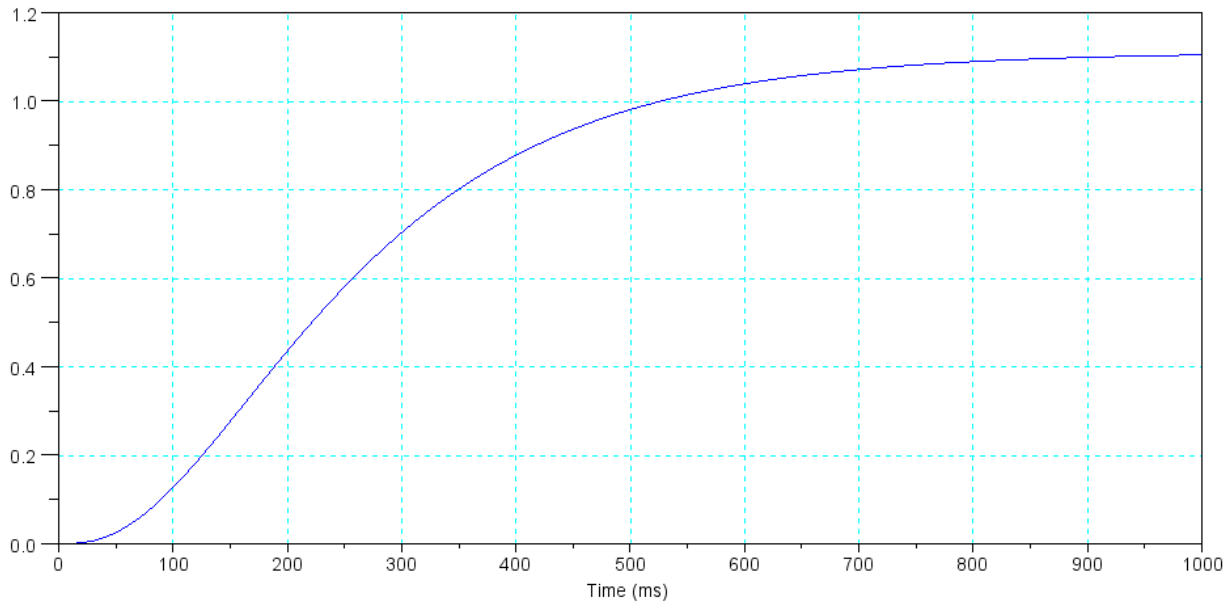
2) Name That System! Give the transfer function for a system with the following step response.

Problem 3 - 6) Assume

$$Y = \left(\frac{500}{(s+2)(s+12)(s+15)} \right) X$$

3) What is the differential equation relating X and Y?

4) Determine y(t) assuming x(t) is a sinusoidal input:

$$x(t) = 4\cos(5t) + \sin(5t)$$

5) Determine y(t) assuming x(t) is a step input:

$$x(t) = u(t)$$

6a) Determine a 1st-order approximation for this system

$$Y \approx \left(\frac{a}{s+b} \right) X$$

6b) Compare the step response of your 1st-order model to the actual 3rd-order system