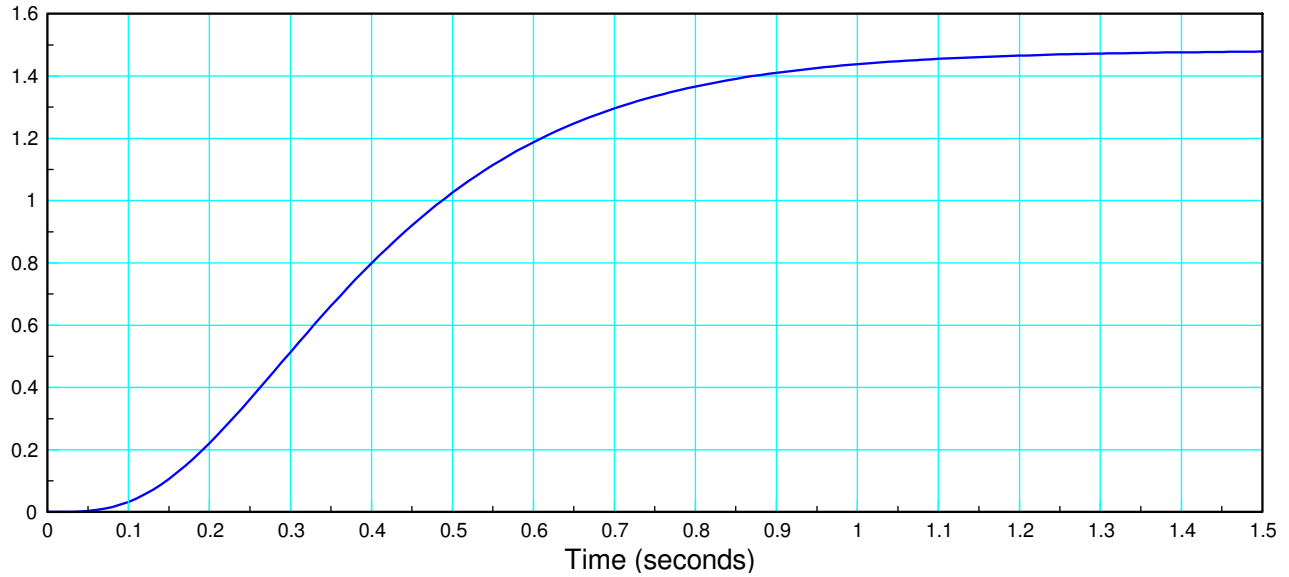


ECE 463/663 - Homework #1

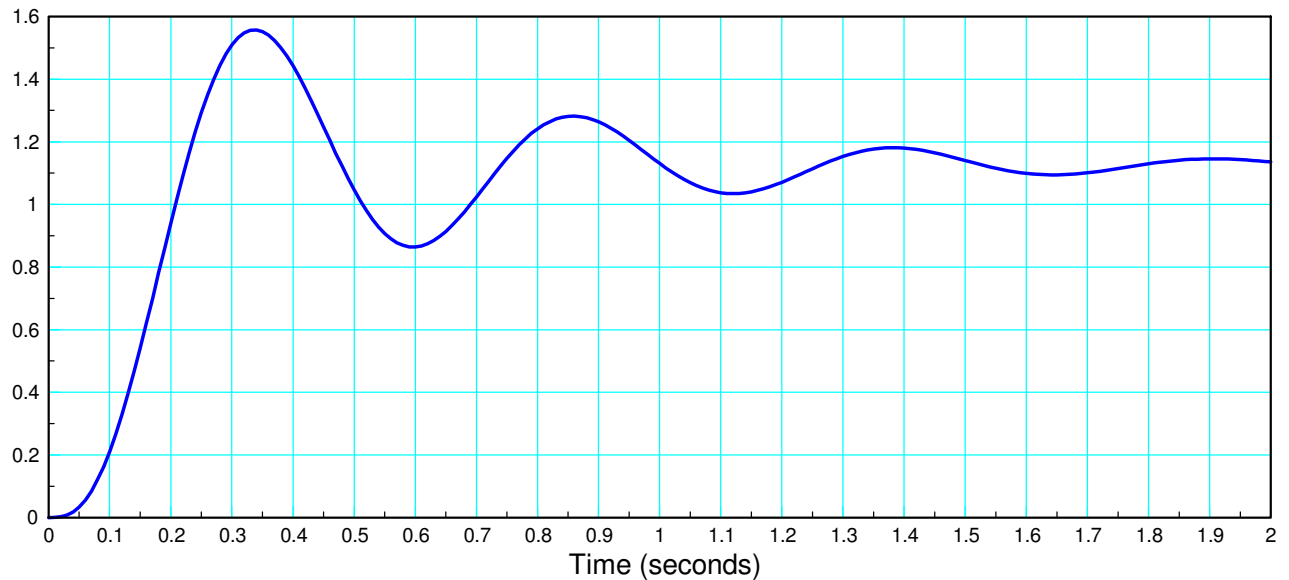
LaPlace Transforms and Dominant Poles. Due Wednesday, Jan 18th

Please submit as a hard copy or submit on BlackBoard

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

$$Y = \left(\frac{50(s+7)}{(s+3)(s+9)(s+12)} \right) X$$

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

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

$$x(t) = 2 \cos(7t) + 5 \sin(7t)$$

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

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

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

$$Y = \left(\frac{50(s+7)}{(s+3)(s+9)(s+12)} \right) X \approx \left(\frac{a}{s+b} \right) X$$

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