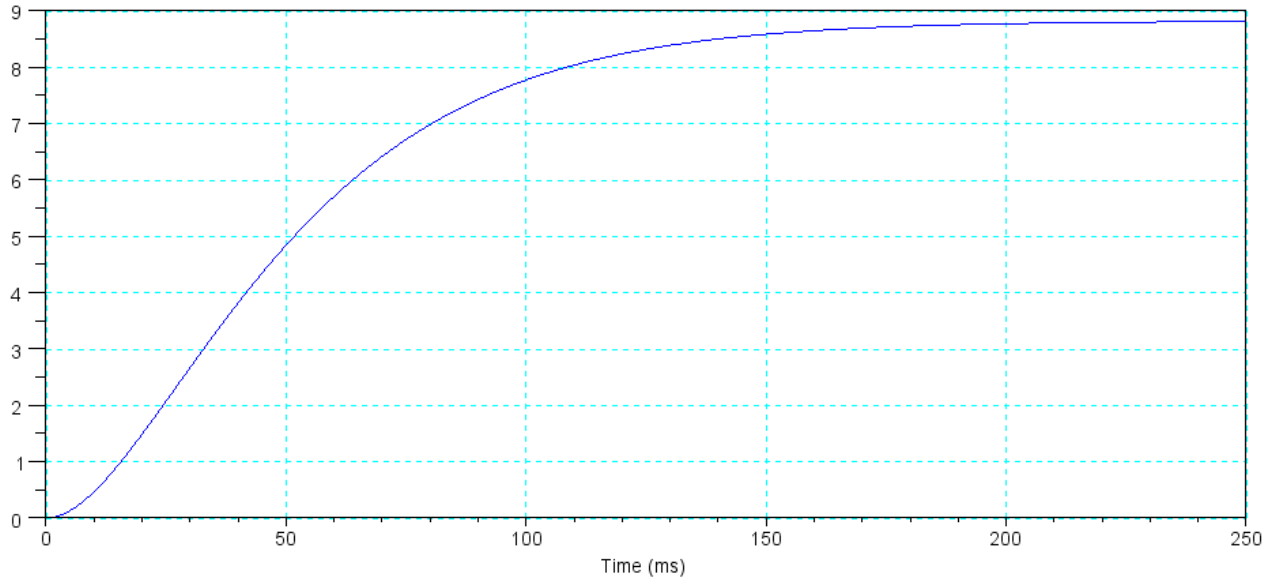


ECE 463/663 - Homework #1

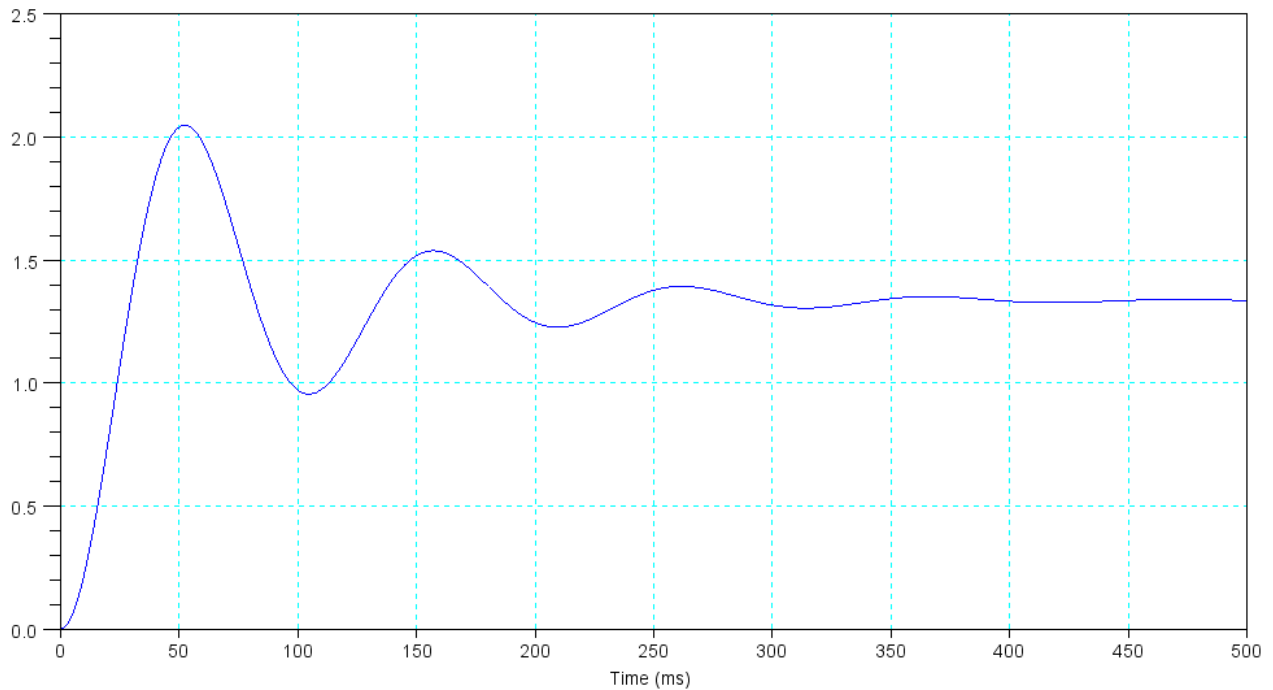
LaPlace Transforms and Dominant Poles. Due Wednesday, Jan 20th

Please make the subject "ECE 463/663 HW#1" if submitting homework electronically to Jacob_Glower@yahoo.com (or 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

$$Y = \left(\frac{300}{(s+3)(s+9)(s+10)} \right) X$$

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

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

$$x(t) = 2 \cos(3t) + 4 \sin(3t)$$

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