

ECE 343 - Homework #15

Transfer Functions and LaPlace Transforms - Summer 2018

Problem 1) Assume X and Y are related by

$$Y = \left(\frac{10}{s+1} \right) X$$

- What is the differential equation which relates X and Y?
- Find y(t) assuming

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

- Plot your answer with the solution from Matlab using the *step* function.

Problem 2) Assume X and Y are related by

$$Y = \left(\frac{10}{(s+1)(s+5)} \right) X = \left(\frac{10}{s^2+6s+5} \right) X$$

- What is the differential equation which relates X and Y?
- Find y(t) assuming

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

- Plot your answer with the solution from Matlab using the *step* function.

Problem 3) Assume X and Y are related by

$$Y = \left(\frac{10}{(s+1)(s+5)} \right) X = \left(\frac{10}{s^2+6s+5} \right) X$$

- Find y(t) assuming

$$x(t) = \cos(3t)u(t)$$

- Plot your answer with the solution from Matlab using the *impulse* function.

Problem 4) Assume X and Y are related by

$$Y = \left(\frac{10s+200}{(s+2)(s+1+j4)(s+1-j4)} \right) X = \left(\frac{10s+200}{s^3+4s^2+21s+34} \right) X$$

- Find y(t) assuming

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

- Plot your answer with the solution from Matlab using the *step* function.