

Homework #1: ECE 461 / 661

LaPlace Transforms

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Problems 1-3) Assume X and Y are related by the following transfer function

$$Y = \left(\frac{100(s+2)}{(s+1)(s+5)(s+20)} \right) X$$

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

2) Determine y(t) assuming

$$x(t) = 3 \cos(2t) + 5 \sin(2t)$$

3) Determine y(t) assuming x(t) is a unit step input

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

Problems 4-6) Assume X and Y are related by the following transfer function:

$$Y = \left(\frac{400}{(s+1+j4)(s+1-j4)(s+20)} \right) X$$

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

5) Determine y(t) assuming

$$x(t) = 3 \cos(2t) + 5 \sin(2t)$$

6) Determine y(t) assuming x(t) is a unit step input

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