

ECE 341 - Homework #6

LaPlace Transforms, Continuous Probability Density Functions. Summer 2023

LaPlace Transforms

1) Let X and Y be related by the following transfer function:

$$Y = \left(\frac{10s+20}{(s+3)(s+10)} \right) X$$

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

b) Determine y(t) assuming

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

c) Determine y(t) assuming x(t) is the unit step function (0 for t<1, 1 for t>0)

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

2) Let X and Y be related by the following transfer function

$$Y = \left(\frac{10s+200}{(s+3+j10)(s+3-j10)} \right) X$$

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

b) Determine y(t) assuming

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

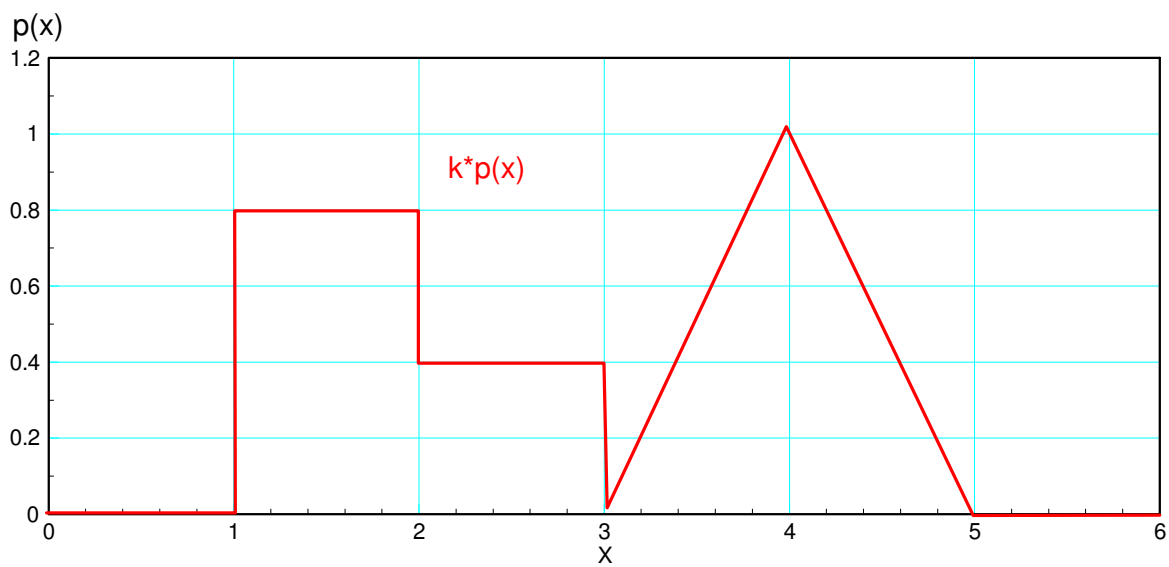
c) Determine y(t) assuming x(t) is the unit step function (0 for t<1, 1 for t>0)

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

Continuous Probability Density Functions

(over)

Continuous Probability Density Functions



- 3) Determine the scalar so that the above function is a valid pdf (i.e. the total area is 1.000)
- 4) Determine the corresponding cdf
- 5) Using Matlab, find 20 random values of x for the above pdf
- 6) Find the moment generating function for $p(x)$