

ECE 3337 Sum-3, 2016 Hebert, Homework 8, Due Tues Due 7/12

Problem 1.

Find the convolution of $f(t) = e^{-2t}u(t)$ and $h(t) = [u(t) - u(t - 2)]$ by the methods:

- (a) taking the FT of each, multiplying the FFTs together, then finding the inverse FT of the product (use partial fractions). You will need the fact that, for any complex function $B(w)$, $B(w)\delta(w) = B(0)\delta(w)$
(b) evaluating the convolution integral.

Problem 2.

Find the convolution of $f(t) = t u(t + 1) + \delta(t - 3)$ and $h(t) = (t - 1) [u(t - 1) - u(t - 2)]$ by evaluating the convolution integral.

Problem 3.

Find the convolution of $f(t) = 2 [u(t + 1) - u(t - 2)]$ and $h(t) = e^{-t+1} u(t - 2)$ by evaluating the convolution integral.

Problem 4. (Problem 2-17 in your book – Ziemer.) Where ‘*’ denotes convolution, find $y(t) = x(t) * h(t)$ by evaluating the convolution integral. (You don't need to sketch the resulting $y(t)$)

(a) $x(t) = 2 \exp(-10t) u(t)$
 $h(t) = \Pi(t/2) = u(t + 1) - u(t - 1)$

(c) $x(t) = 2 \exp(-10t) u(t)$
 $h(t) = u(t - 2)$

Problem 5.

Find the convolution of $f(t) = e^{+2t}u(-t)$ and $h(t) = [u(t) - u(t - 2)]$ by evaluating the convolution integral.

Problem 6.

Simplify the following step-function expressions to find the arguments α and β . (hint: try plotting the step functions to help you simplify the expression).

(a) $u(t + 1)u(2 - t) = [u(\alpha) - u(\beta)]$
(b) $[u(t + 4) - u(t + 1)] = u(\alpha)u(\beta)$