ECE 300
Signals and Systems
Homework 1

Due Date: Tuesday September 9, 2008 *at the beginning of class*

Reading: Roberts pages 1-28 and your course notes.

Problem:

1) Simplify the following as much as possible. Use unit step functions where necessary instead of inequalities.

a) $y(t) = \delta(t)\delta(t-2)$

b) $y(t) = \int_{-\infty}^{\infty} \delta(\lambda)\delta(\lambda - 2)d\lambda$

c) $y(t) = \int_{-\infty}^{\infty} \delta(\lambda)\delta(\lambda - t)d\lambda$

d) $y(t) = \int_{0}^{t-1} e^{-(t-\lambda)}\delta(\lambda - 1)d\lambda$

e) $y(t) = \int_{-\infty}^{\infty} e^{-(t-\lambda)}\delta(t - \lambda)d\lambda$

f) $y(t) = x(t)\delta(t-3) + \delta(t)$

g) $y(t) = \int_{-\infty}^{\infty} [x(\lambda)\delta(t-\lambda) + \delta(\lambda)]d\lambda$

h) $y(t) = \int_{-\infty}^{t} u(\lambda)u(\lambda - 2)d\lambda$

i) $y(t) = \int_{-\infty}^{t} u(\lambda)u(\lambda + 2)d\lambda$

j) $y(t) = \int_{-\infty}^{\infty} u(1 - \lambda)u(\lambda - 1)d\lambda$

k) $y(t) = \int_{-\infty}^{t} e^{-2(t-\lambda)}\delta(\lambda - 1)d\lambda$

l) $y(t) = \int_{-\infty}^{\infty} u(\lambda + 1)u(1 - \lambda)d\lambda$

m) $y(t) = \int_{-\infty}^{t-2} e^{-2(t-\lambda)}\delta(\lambda)d\lambda$

n) $y(t) = \int_{-5}^{8} \delta(\lambda + 10)d\lambda$

o) $y(t) = \int_{t-1}^{\infty} \delta(\lambda)d\lambda$

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