

ECE 301: Homework 5

Due: 7/21/15

Problem 1

Find the CT Fourier transforms of the following CT signals.

$$x_1(t) = e^{-2|t-1|}e^{j(t-2)}.$$

$$x_2(t) = \frac{\sin(2\pi t)}{\pi(t-2)}.$$

$$x_3(t) = \text{sinc}(at + b)$$

where a and b are fixed real numbers.

Problem 2

The response of a continuous-time LTI system S to the input signal $x(t) = e^{-2t}u(t)$ is $y(t) = e^{-t}u(t) - e^{-3t}u(t)$. Find the frequency response $H(j\omega)$ and the impulse response $h(t)$ for this system.

Problem 3

Find the inverse CT Fourier transforms of the following spectra:

$$X_1(j\omega) = \pi e^{-2|\omega|}.$$

$$X_2(j\omega) = u(\omega - 10) - u(\omega - 20).$$

Problem 4

Page 336, Problem 4.10.

Problem 5

Page 336, Problem 4.12.

Problem 6

Page 341, Problem 4.27.

Problem 7

Page 342, Problem 4.28.

Problem 8

Page 345, Problem 4.32.