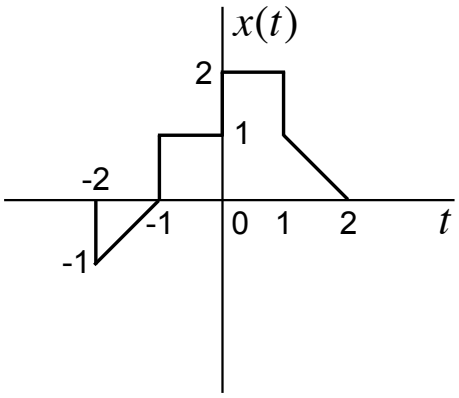
EE3210 Signals and Systems

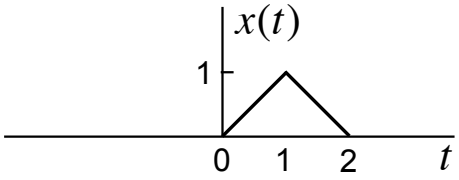
Tutorial 1

Problem 1: A continuous-time signal $x(t)$ is shown in the figure below.



Sketch and label carefully the signal $x(4 - t/2)$.

Problem 2: Determine and sketch the even and odd parts of the signal depicted in the figure below. Label your sketches carefully.



Problem 3: In this problem, we explore several of the properties of even and odd signals.

(a) Show that if $x(t)$ is an odd signal, then

$$\int_{-\infty}^{+\infty} x(t)dt = 0$$

(b) Show that if $x_1(t)$ is an odd signal and $x_2(t)$ is an even signal, then $x_1(t)x_2(t)$ is an odd signal.

(c) Let $x(t)$ be an arbitrary signal with even and odd parts denoted by

$$x_e(t) = \mathcal{E}\{x(t)\} = \frac{1}{2}[x(t) + x(-t)]$$

and

$$x_o(t) = \mathcal{O}\{x(t)\} = \frac{1}{2}[x(t) - x(-t)].$$

Show that

$$\int_{-\infty}^{+\infty} x^2(t)dt = \int_{-\infty}^{+\infty} x_e^2(t)dt + \int_{-\infty}^{+\infty} x_o^2(t)dt.$$