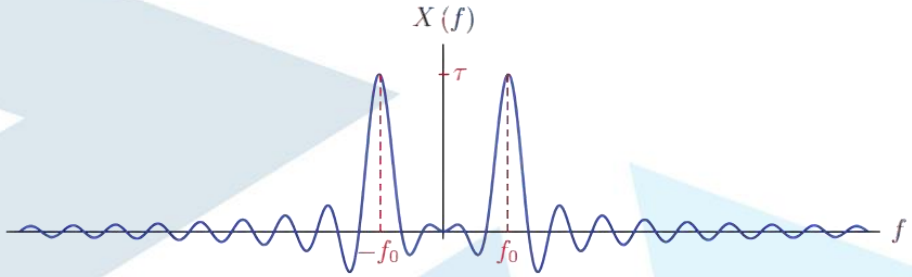
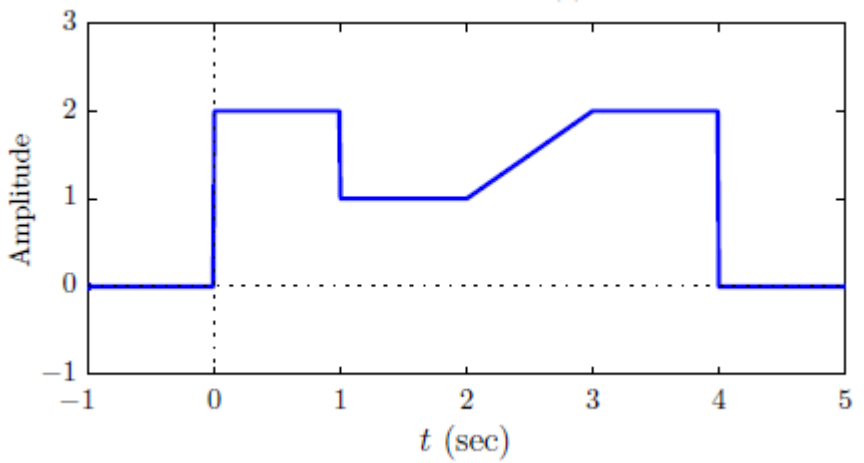
CECC507: Signals and Systems
Lecture 1: Signal Representation and Modeling



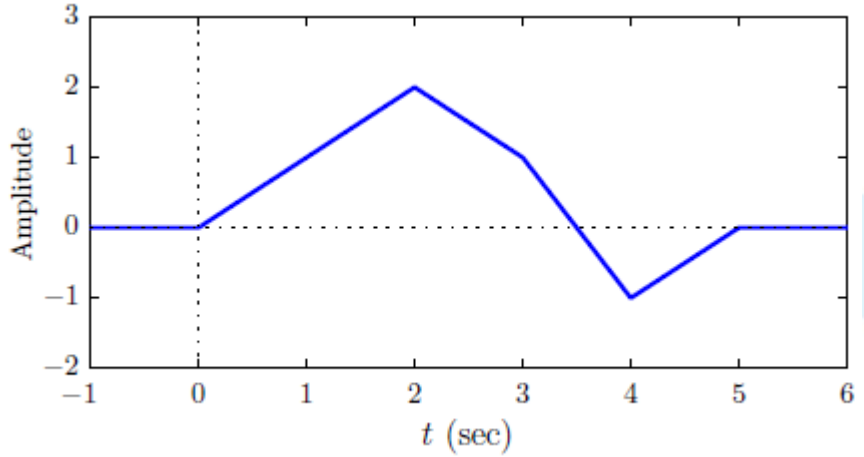
Eng. Aya Kherbek
Eng. Baher Kherbek
Faculty of Engineering
Department of Robotics And Intelligent Systems
Manara University

1. Sketch and label each of the signals defined below:

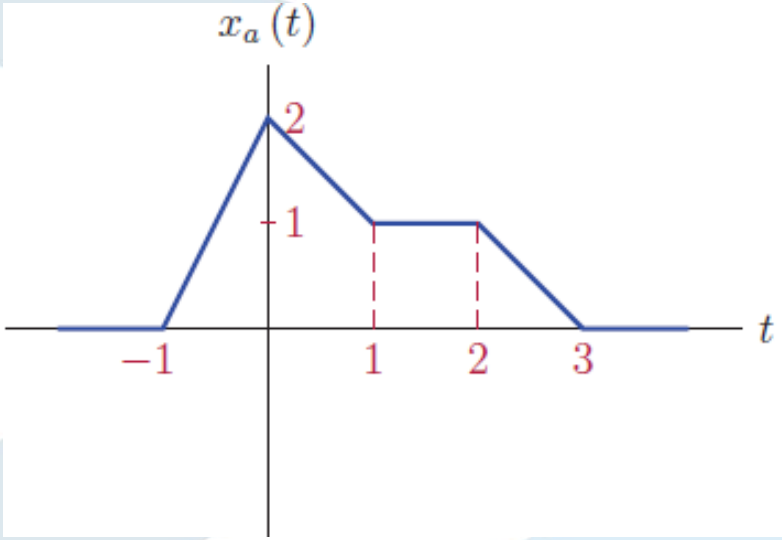
$$x_a(t) = \begin{cases} 0, & t < 0 \text{ or } t > 4 \\ 2, & 0 < t < 1 \\ 1, & 1 < t < 2 \\ t - 1, & 2 < t < 3 \\ 2, & 3 < t < 4 \end{cases}$$

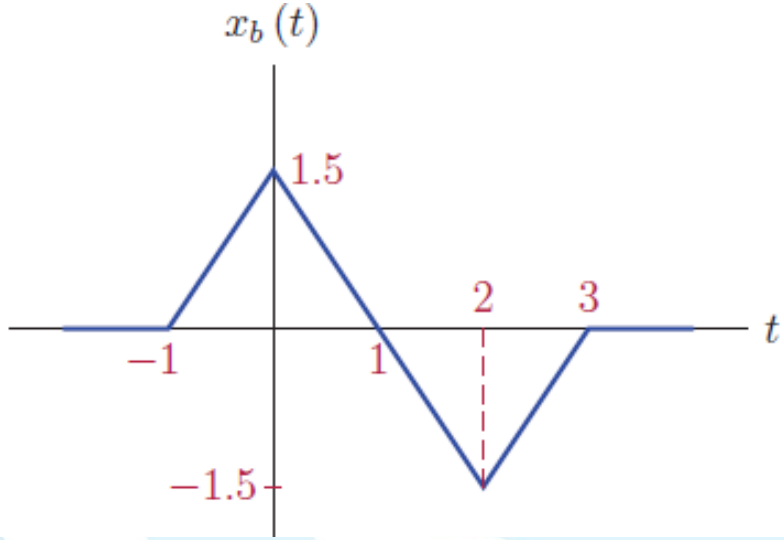


$$x_b(t) = \begin{cases} 0, & t < 0 \text{ or } t > 5 \\ t, & 0 < t < 2 \\ -t + 4, & 2 < t < 3 \\ -2t + 7, & 3 < t < 4 \\ t - 5, & 4 < t < 5 \end{cases}$$



2. Using the two signals $x_a(t)$ and $x_b(t)$, compute and sketch the signals specified below:

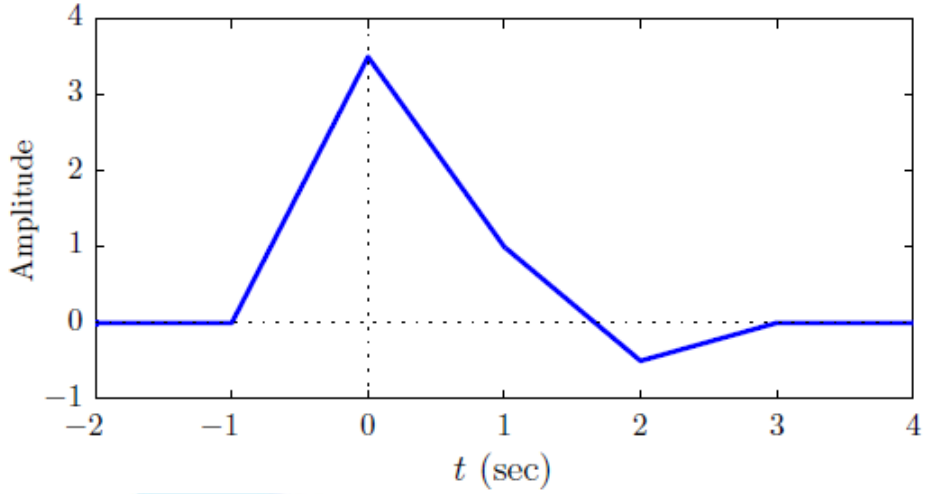




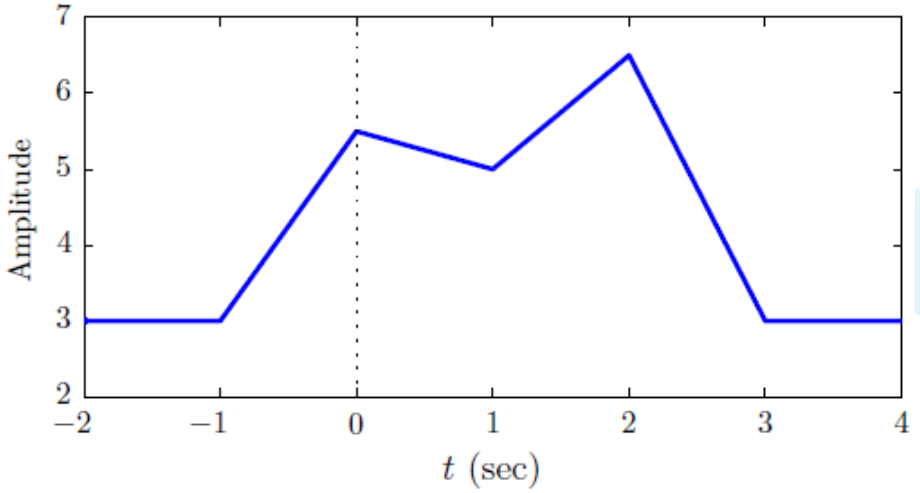
a. $g_1(t) = x_a(t) + x_b(t)$

b. $g_2(t) = 2x_a(t) - x_b(t) + 3$

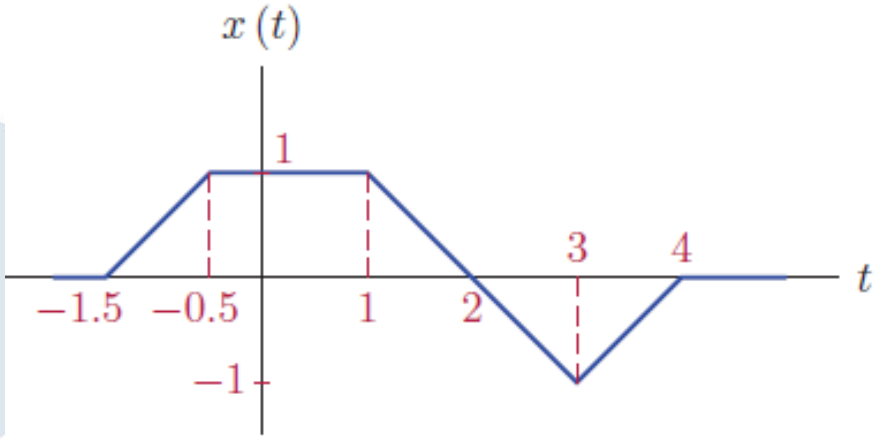
$$g_1(t) = \begin{cases} 0, & t < -1 \text{ or } t > 3 \\ 3.5t + 3.5, & -1 < t < 0 \\ -2.5t + 3.5, & 0 < t < 1 \\ -1.5t + 2.5, & 1 < t < 2 \\ 0.5t - 1.5, & 2 < t < 3 \end{cases}$$



$$g_2(t) = \begin{cases} 3, & t < -1 \text{ or } t > 3 \\ 2.5t + 5.5, & -1 < t < 0 \\ -0.5t + 5.5, & 0 < t < 1 \\ 1.5 + 3.5, & 1 < t < 2 \\ -3.5t + 13.5, & 2 < t < 3 \end{cases}$$



3. For the signal $x(t)$ shown, compute the following:

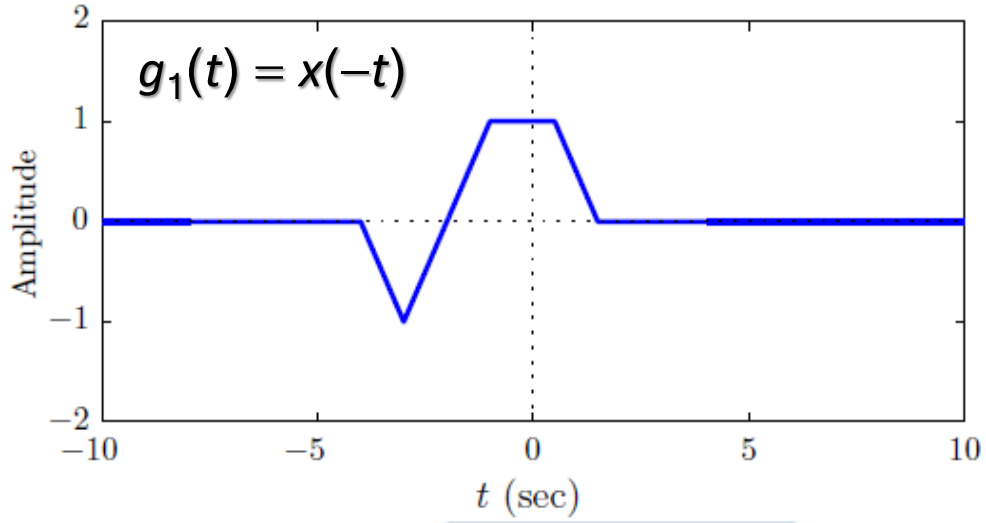


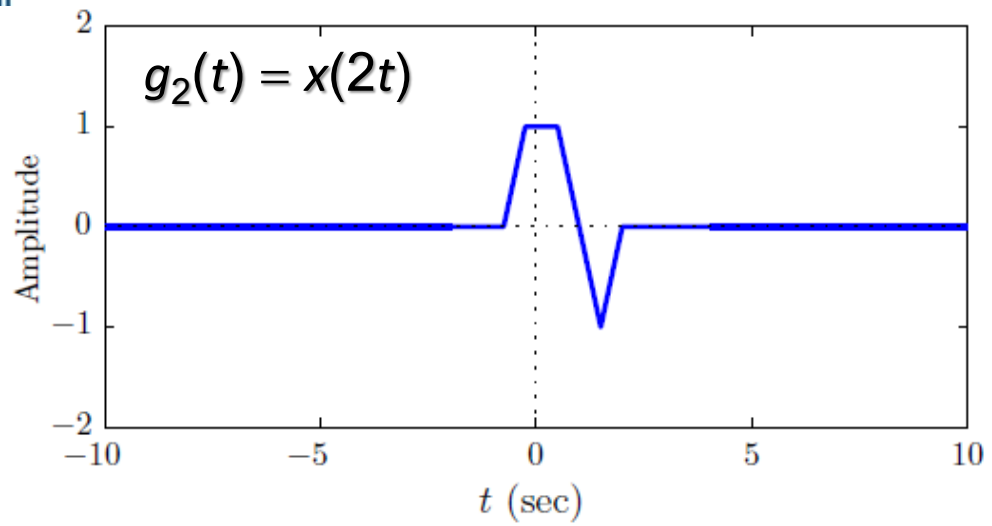
a. $g_1(t) = x(-t)$

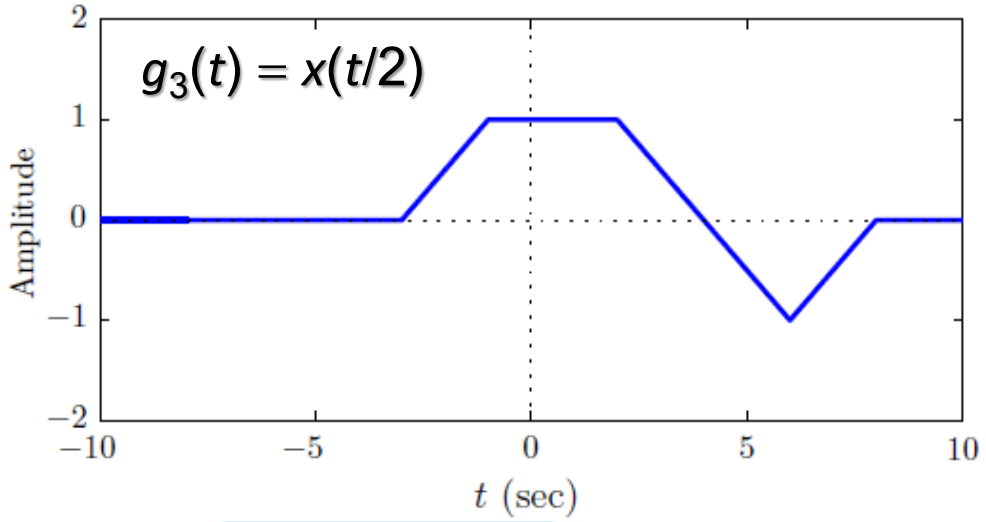
b. $g_2(t) = x(2t)$

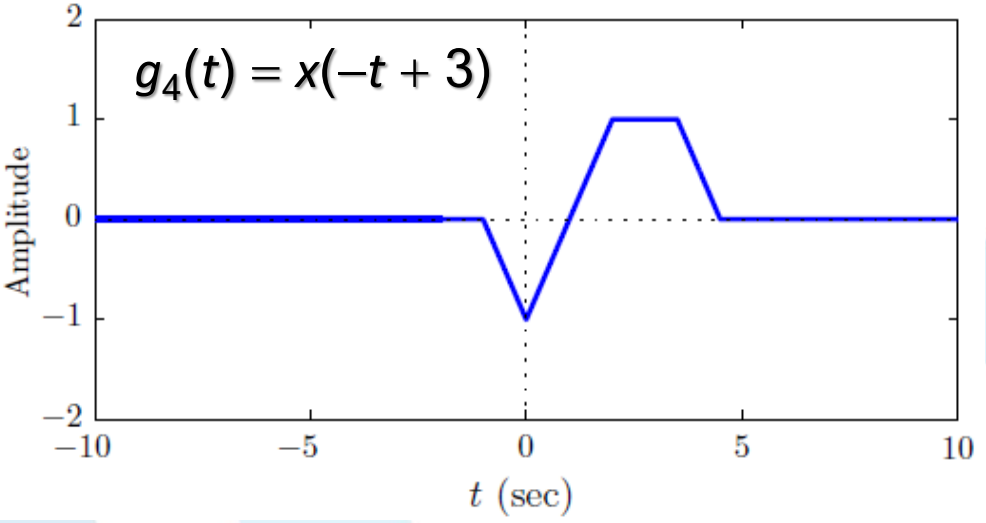
c. $g_3(t) = x(t/2)$

d. $g_4(t) = x(-t + 3)$


$g_1(t) = x(-t)$
Amplitude
t (sec)


$g_2(t) = x(2t)$
Amplitude
t (sec)


$g_3(t) = x(t/2)$
Amplitude
t (sec)


$g_4(t) = x(-t + 3)$
Amplitude
t (sec)

جَامعة
المَنارة
MANARA UNIVERSITY

Thanks for Listening