BIRZEIT UNIVERSITY
Electrical and Computer Engineering Department
ENEE2312, Signals & Systems
MATLAB Assignment

Solve the questions in this assignment using Matlab (you can use Matlab Online)
Submit a hardcopy report (Codes + Plots) no later than Thursday, 25/8/2022
Some of the numbers in the questions are given as (A, B, and C); the values of these terms depend on your university ID Number.
Example:
Assume having the following ID number 1110598, then, A = 5, B = 9 and C = 8.
In case A or B or C corresponds to zero in your ID number, make its value 5 instead of zero.

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1. Generate and Plot the following signals

A. $x(t)=\Pi\left[(t-3)/A\right]+\Pi\left[(t-C)/B\right]$
B. $x_b(t)=r(t)-\mathrm{r}(\mathrm{t}-A)-\mathrm{r}(\mathrm{t}-B)+\mathrm{r}(\mathrm{t}-C)$

2. Consider the following signals:

$$x_1(t)=A\sin(10\pi t),\quad x_2(t)=\frac{1}{3}\mathrm{A}\sin(30\pi t),\quad x_3(t)=\frac{1}{5}\mathrm{A}\sin(50\pi t)$$

A. Generate and plot $x_1(t)$ for one period.
B. Generate and plot $x_b(t)=x_1(t)+x_2(t)$ for one period.
C. Generate and plot $x_c(t)=x_1(t)+x_2(t)+x_3(t)$ for one period.
Show all the results on one figure using *subplot*
D. Determine, using Matlab plots, if the generated signals are periodic or not.

3. Find and sketch the signal y(t) which is the convolution of the two pairs if signals.

$$x(t)=\left[e^{-2t}-Ce^{-10t}\right]u(t),\quad h(t)=\Pi\left(\frac{t-B}{A}\right)$$

4. For LTI system $h(t)=Ae^{-Bt}$, consider the input square wave be:

$$\mathrm{x}(t)=A+\sum_{\substack{k=-\infty\\ k\ odd}}^{\infty}\frac{B}{\pi k}e^{-j\pi/2}e^{jkt}$$

A. Plot the system frequency response (Amplitude and Phase).
B. Plot the system time response for the square wave input (consider the time interval [0:0.1:7])