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 softcopy report no later than Saturday 05/6/2021
Some of 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:

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

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. Consider the following Differential Equation

$$\frac{d^2y(t)}{dt^2}+A\frac{dy(t)}{dt}+By(t)=C+5\cos(1500\mathrm{t})$$

A. Solve it (write code) for $t\geq 0$ using zero initial conditions.
B. Determine the response of the LTI systems for the given input and initial conditions: $y(0)=0, y'(0)=A$