## Experiment - 1

1.1 Generate and plot elementary signals.

a] Impulse signal, $\delta(t)$ and $\delta[n]$

b] Step signal, $u(t)$ and $u[n]$

c] Ramp signal, $r(t)$ and $r[n]$

1.2 Time domain representation of continuous and discrete time signals. Generate and plot the following

a] $x(t) = A\sin(2\pi t) + B\cos(3\pi t)$

b] $x[n] = u[n] - u[n-4]$

c] $x[n] = \delta[n] + 2\delta[n-1] + 4\delta[n-2] - 6\delta[n-4]$

d] Square wave of frequency 4Hz and duty cycle of 40%

**18BIS0043**

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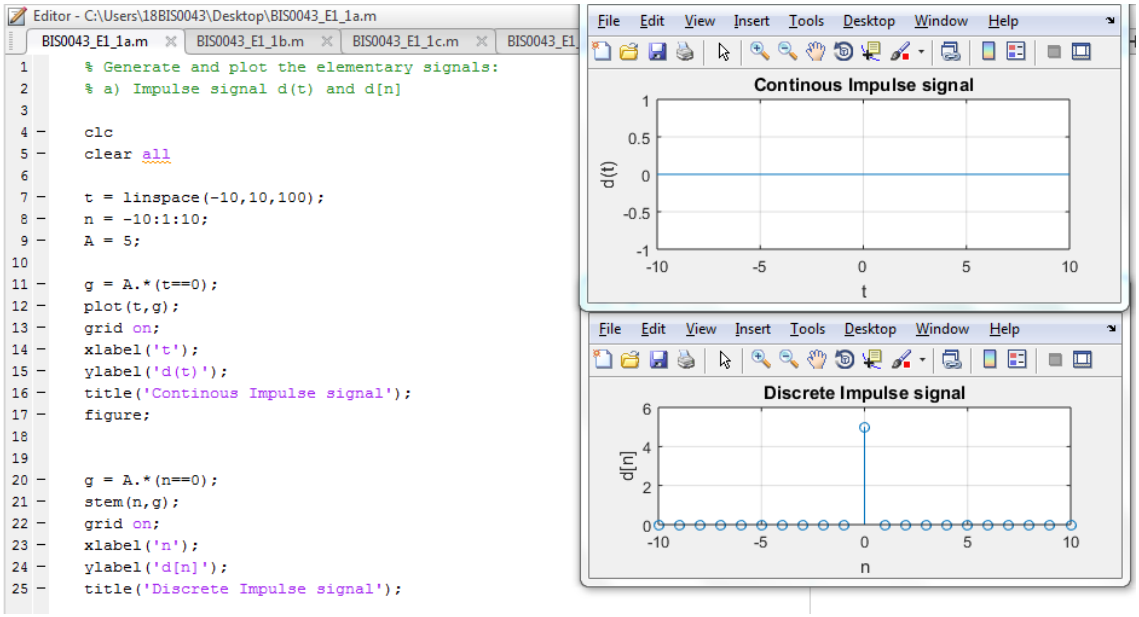
**Assignment 1**

**ECE1018 - ELA**

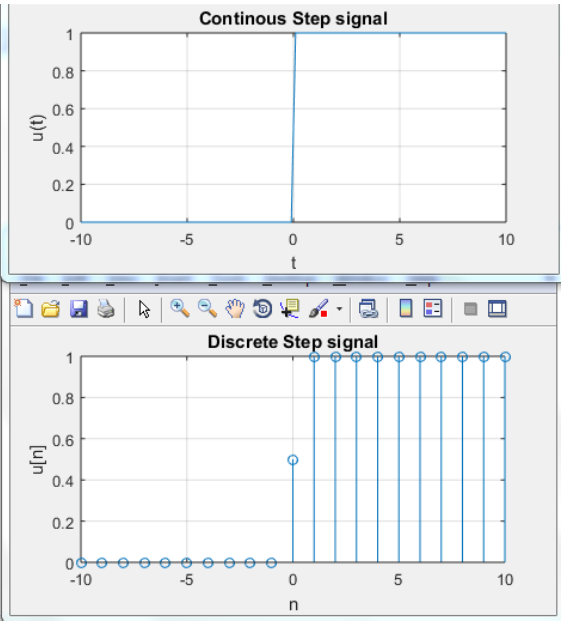
1A




The continuous impulse signal just shows a single point on the value 5, which gets neglected when plotting the graph with a higher number of plotting points.

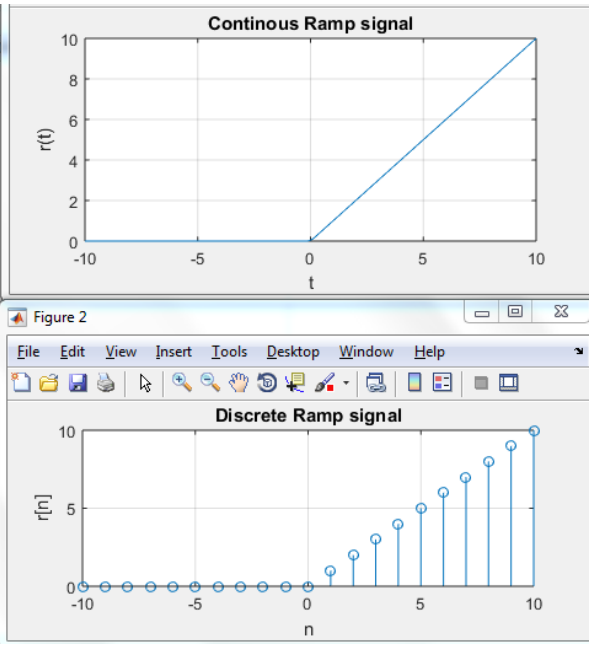
1B

```
% Generate and plot the elementary signals:
% b) Step signal u(t) and u[n]

clc
clear all

t = linspace(-10,10,100);
n = -10:1:10;
g1 = 0;
g2 = 1/2;
g3 = 1;
g = g1.*(t<0)+g2.*(t==0)+g3.*(t>0);
plot(t,g);
grid on;
xlabel('t');
ylabel('u(t)');
title('Continous Step signal');
figure;

g = g1.*(n<0)+g2.*(n==0)+g3.*(n>0);
stem(n,g);
grid on;
xlabel('n');
ylabel('u[n]');
title('Discrete Step signal');
```

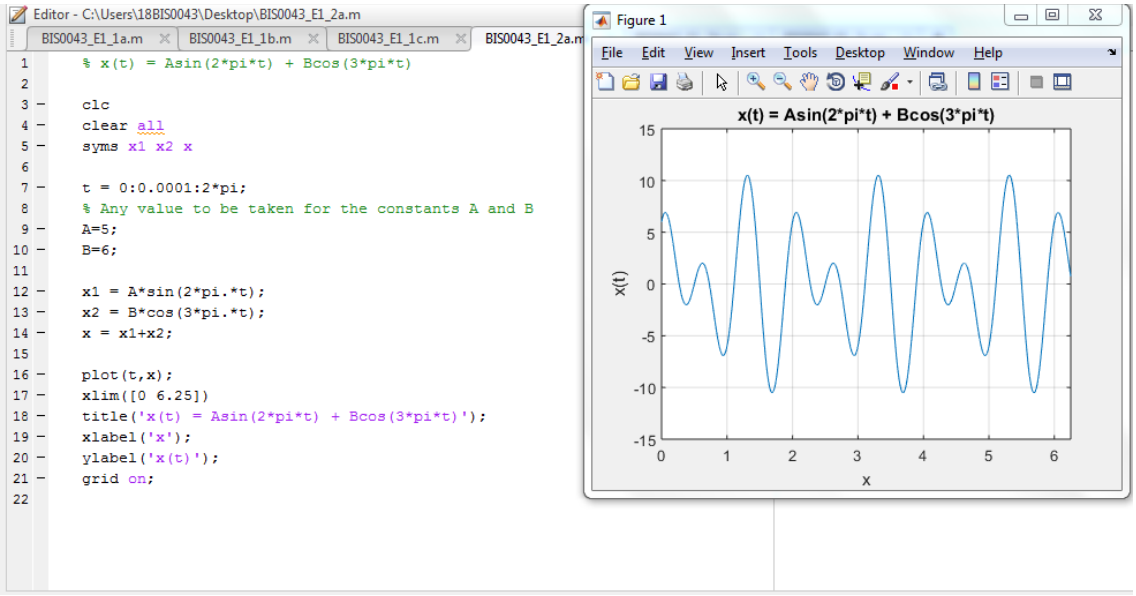



1C

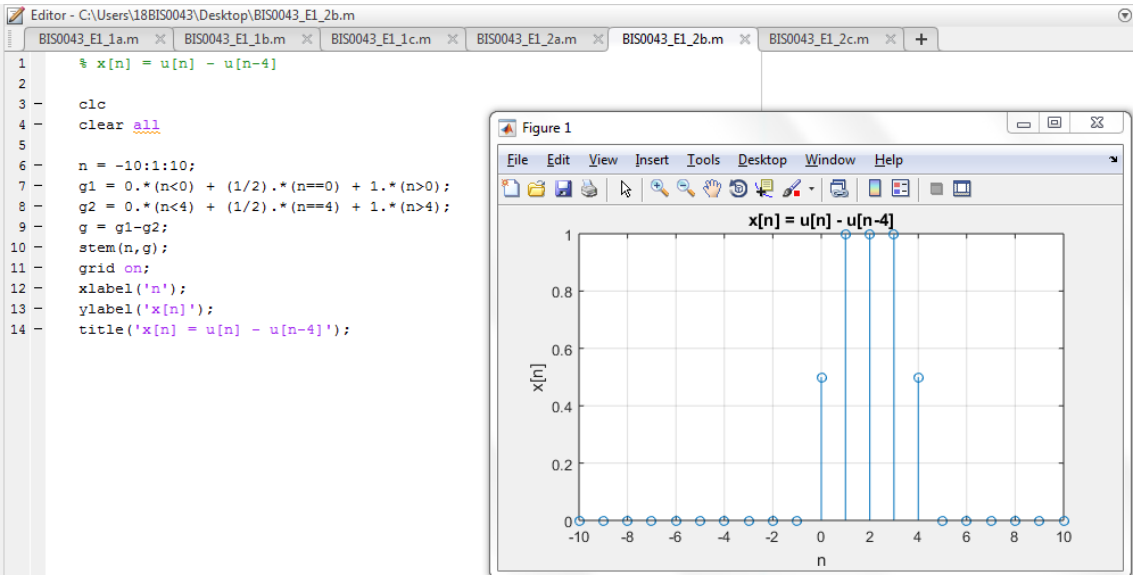
```
% Generate and plot the elementary signals:
% c) Ramp signal r(t) and r[n]
clc
clear all
t = linspace(-10,10,100);
n = -10:1:10;
g1 = 0;

g = g1.*(t<0)+t.*(t>=0);
plot(t,g);
xlabel('t');
ylabel('r(t)');
title('Continous Ramp signal');
grid on;
figure;

g = g1.*(n<0)+n.*(n>=0);
stem(n,g);
xlabel('n');
ylabel('r[n]');
title('Discrete Ramp signal');
grid on;
```



2A

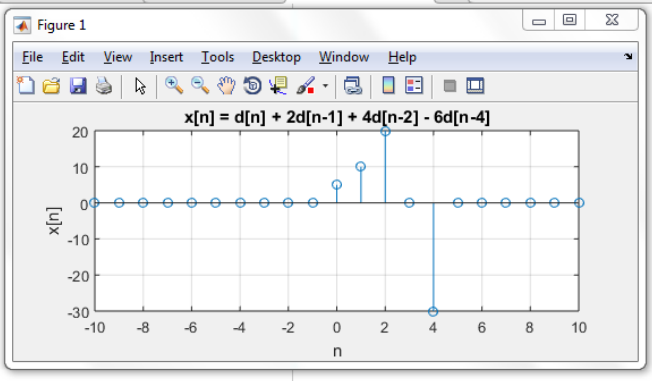

Editor - C:\Users\18BIS0043\Desktop\BIS0043_E1_2a.m
BIS0043_E1_1a.m
BIS0043_E1_1b.m
BIS0043_E1_1c.m
BIS0043_E1_2a.m
% x(t) = Asin(2*pi*t) + Bcos(3*pi*t)
clc
clear all
syms x1 x2 x
t = 0:0.0001:2*pi;
% Any value to be taken for the constants A and B
A=5;
B=6;
x1 = A*sin(2*pi.*t);
x2 = B*cos(3*pi.*t);
x = x1+x2;
plot(t,x);
xlim([0 6.25])
title('x(t) = Asin(2*pi*t) + Bcos(3*pi*t)');
xlabel('x');
ylabel('x(t)');
grid on;
Figure 1
File Edit View Insert Tools Desktop Window Help
x(t) = Asin(2*pi*t) + Bcos(3*pi*t)
x(t)
x

2B


Editor - C:\Users\18BIS0043\Desktop\BIS0043_E1_2b.m
BIS0043_E1_1a.m
BIS0043_E1_1b.m
BIS0043_E1_1c.m
BIS0043_E1_2a.m
BIS0043_E1_2b.m
BIS0043_E1_2c.m
% x[n] = u[n] - u[n-4]
clc
clear all
n = -10:1:10;
g1 = 0.*(n<0) + (1/2).*(n==0) + 1.*(n>0);
g2 = 0.*(n<4) + (1/2).*(n==4) + 1.*(n>4);
g = g1-g2;
stem(n,g);
grid on;
xlabel('n');
ylabel('x[n]');
title('x[n] = u[n] - u[n-4]');
Figure 1
File Edit View Insert Tools Desktop Window Help
x[n] = u[n] - u[n-4]
x[n]
n

2C

```
% x[n] = d[n] + 2d[n-1] + 4d[n-2] -6d[n-4]

clc
clear all

n = -10:1:10;

g1 = 5.*(n==0);
g2 = 5.*(n==1);
g3 = 5.*(n==2);
g4 = 5.*(n==4);

g = g1 + 2.*g2 + 4.*g3 - 6.*g4;
stem(n,g);

grid on;
xlabel('n');

ylabel('x[n]');
title('x[n] = d[n] + 2d[n-1] + 4d[n-2] - 6d[n-4]');
```




2D

```
% Square Wave of 4 Hz and duty cycle 40%

clc
clear all

t = linspace(-10,10,100);
duty = 40;
fx = square(2*pi*4*t,duty)

plot(t,fx);
grid on;
xlim([-6 6]);
ylim([-2 2]);
xlabel('t');
ylabel('f(t)');
title('Square wave');

figure;
dutycycle(fx,t);
```