Mawlana Bhashani Science and Technology University

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Lab Report

Department of Information and Communication Technology

Report No: 01
Report Name: **MATLAB program to Plot Continuous and discrete time signals**
Course Title: Digital Signal Processing Lab
Course Code: ICT-4206

Submitted By	Submitted To
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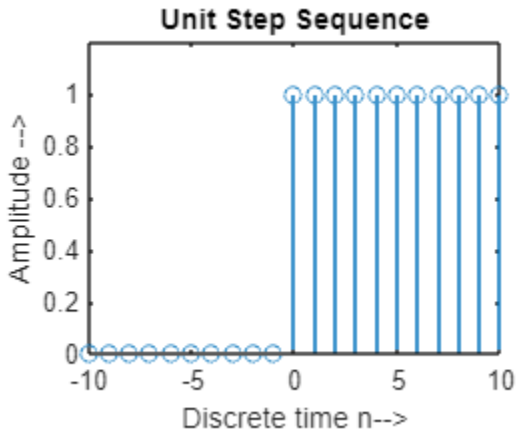
1. **Write a MATLAB program to plot the following Continuous time and discrete time signals**

Step Function

Source Code:

```
clc;
clear all;
close all;
n=-10:1:10;
Step=[zeros(1,10),ones(1,11)];
subplot(2,2,2);
stem(n,Step);
xlabel('Discrete time n-->');
ylabel('Amplitude -->');
title('Unit Step Sequence');
axis([-10 10 0 1.2]);
```

Output:



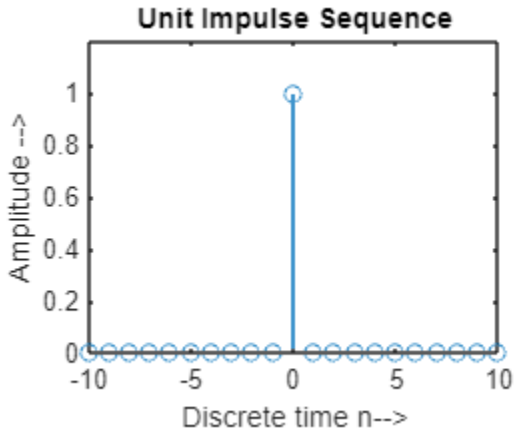
Impulse Function

Source Code:

```
clc;
clear all;
close all;
n=-10:1:10;
Impulse=[zeros(1,10),ones(1,1),zeros(1,10)];
subplot(2,2,1);
stem(n,Impulse);
xlabel('Discrete time n-->');
ylabel('Amplitude -->');
title('Unit Impulse Sequence');
```

```
axis([-10 10 0 1.2]);
```

Output:



Exponential Function

Source Code:

```
Y=exp(li*pi)
```

Output:

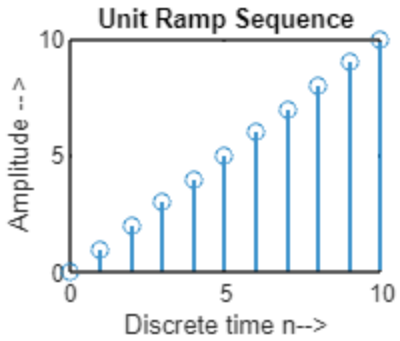
```
>> exp

Y =

  -1.0000 + 0.0000i
```

Ramp Function

Source Code:

```
clc;
clear all;
close all;
n=0:1:10;
ramp=n;
subplot(2,2,3);
stem(n,ramp);
xlabel('Discrete time n-->');
ylabel('Amplitude -->');
title('Unit Ramp Sequence');
```

Output:

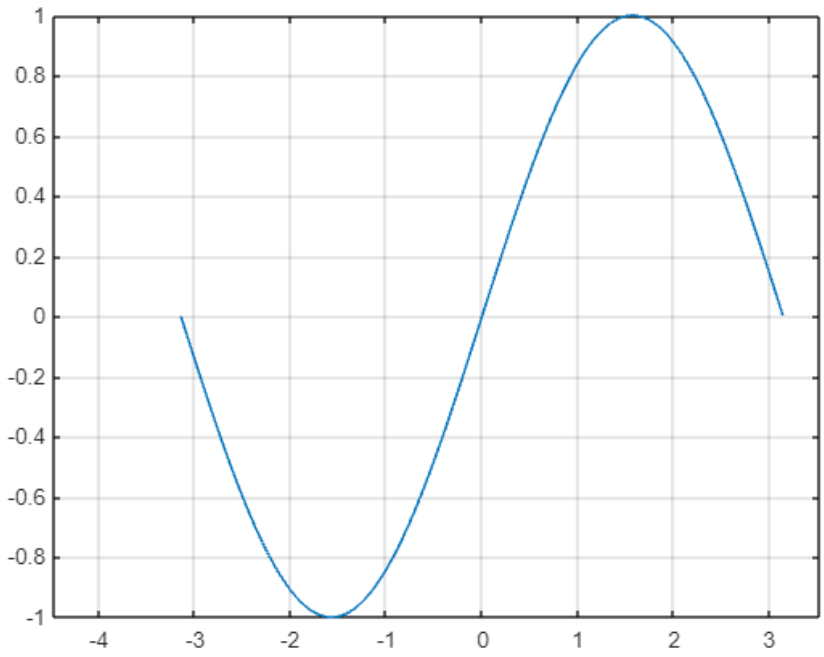


Sine Function

Source Code:

```
x = -pi:0.01:pi;
plot(x,sin(x)), grid on
```

Output:



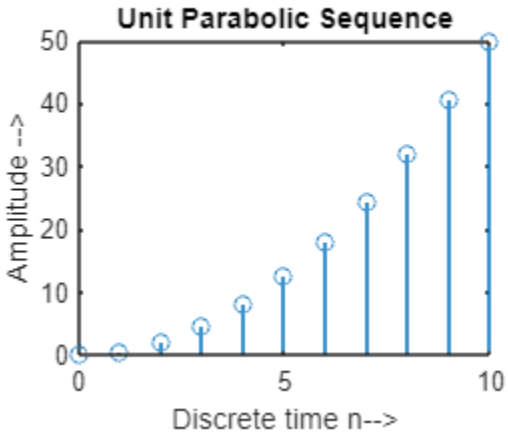
Parabolic Function

Source Code:

```
clc;
```

```
clear all;
close all;
n=0:1:10;
parabola=0.5*(n.^2);
subplot(2,2,4);
stem(n,parabola);
xlabel('Discrete time n-->');
ylabel('Amplitude -->');
title('Unit Parabolic Sequence');
```

Output:



2.Write a MATLAB program to perform amplitude-scaling, time-scaling and time shifting , time reversal on a given signal.

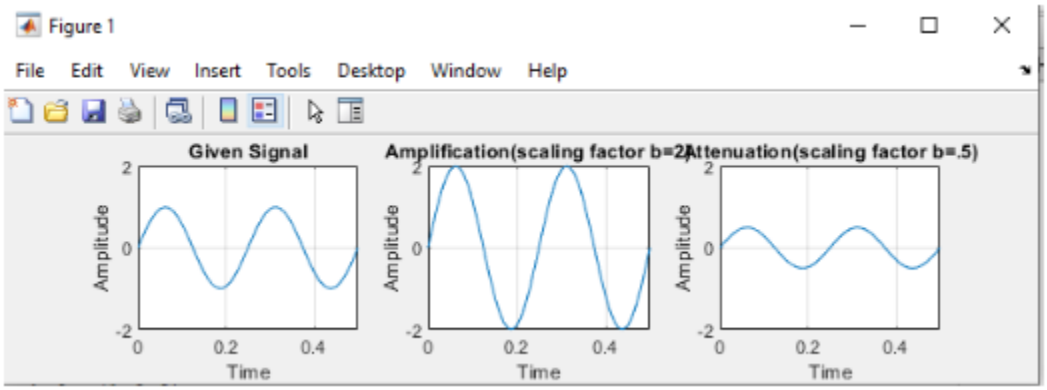
Amplitude-Scaling

Source Code:

```
% Amplitude Scaling
clc;
close all;
clear all;
t=0:.01:.5;
% original signal
y=sin(2*pi*4*t);
subplot(1,3,1);
plot(t,y);
xlabel('Time');
ylabel('Amplitude');
title('Given Signal')
axis([0 .5 -2 2]);
grid on;
% Amplification(scaling factor b=2) b=2;
```

```
y1=b.*y;
subplot(1,3,2);
plot(t,y1);
xlabel('Time');
ylabel('Amplitude');
title('Amplification(scaling factor b=2)')
axis([0 .5 -2 2]);
grid on;
% Attenuation(Scaling factor b=.5) b=.5;
y2=b.*y;
subplot(1,3,3);
plot(t,y2);
xlabel('Time');
ylabel('Amplitude');
title('Attenuation(scaling factor b=.5)')
axis([0 .5 -2 2]);
grid on;
```

Output:

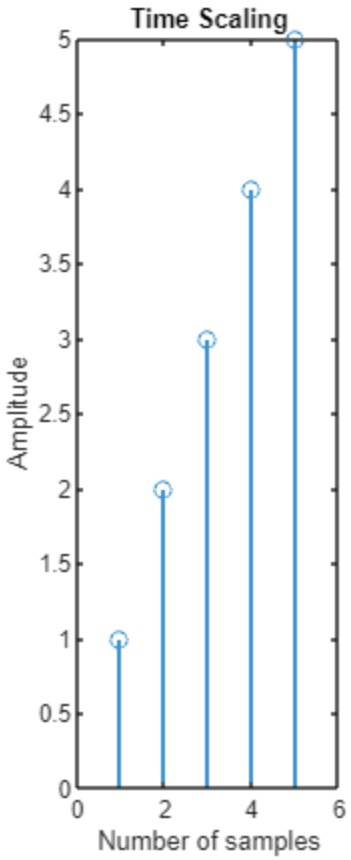


Time-Scaling

Source Code:

```
%Time Scaling
x1=[1 2 3 4 5]
a=length(x1);
n=0:1:a-1;
stem(x1);
xlabel('Number of samples')
ylabel('Amplitude')
title('Time Scaling')
display(x1)
```

Output:



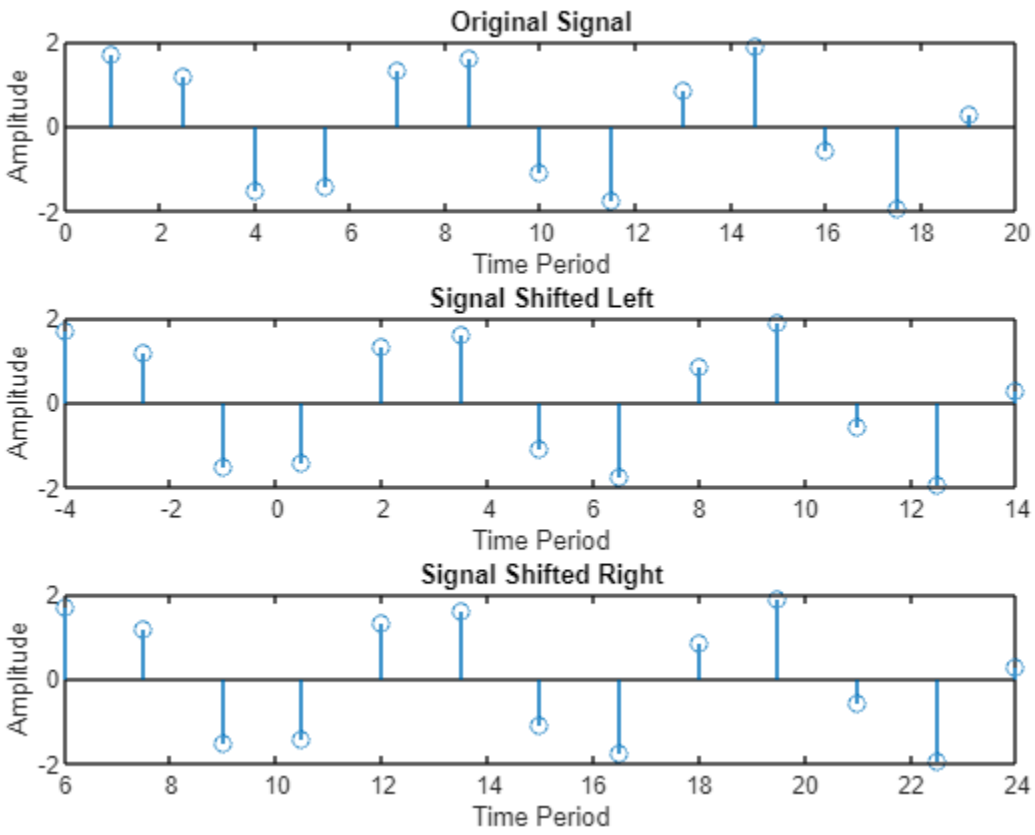
Time-Shifting

Source Code:

```
%Time Shifting
t = 1:1.5:20;
x = 2*sin(t);
subplot(3,1,1);
stem(t,x);
xlabel('Time Period')
ylabel('Amplitude')
title('Original Signal')
subplot(3,1,2)
stem(t-5,x)
xlabel('Time Period')
ylabel('Amplitude')
title('Signal Shifted Left')
subplot(3,1,3)
stem(t+5,x)
xlabel('Time Period')
ylabel('Amplitude')
```

```
title('Signal Shifted Right')
```

Output:



Time Reversal

Source Code:

```
%Time Reversal
t=0:0.1:2*pi;
x1=sin(t);
x2=fliplr(x1);
tr=-flipir(t);
figure
subplot(2,1,1);
stem(t,x1,'Linewidth',3);
xlim([-10 10])
xlabel('\bf\fontsize{20}Time sample');
ylabel('\bf\fontsize{20}AMPLITUDE');
title('\bf\fontsize{25}ORIGINAL SIGNAL');
grid on
ax=gca;
ax.XAxis.FontSize=15;
ax.XAxis.FontWeight='bold';
ax.YAxis.FontSize=15;
```

```
ax.YAxis.FontWeight='bold';
subplot(2,1,1);
stem(tr,x2,'Linewidth',3);
xlim([-10 10])
xlabel('\bf\fontsize{20}Time sample');
ylabel('\bf\fontsize{20}AMPLITUDE');
title('\bf\fontsize{25}TIME REVERSED SIGNAL');
grid on
```

Output: