MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY

DEPARTMENT OF ICT

Lab Report No : 02

Course Code : ICT-4206

Course Title : Digital Signal Processing Lab

Lab Report name : Plot elementary functions of Continuous and Discrete time signals

Submitted by

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Experiment No: 2

Experiment name: Plot elementary functions of continuous and discrete time signals

Objectives: Through this experiment we will learn how to plot different elementary functions of continuous and discrete time signals.

i. Step function:

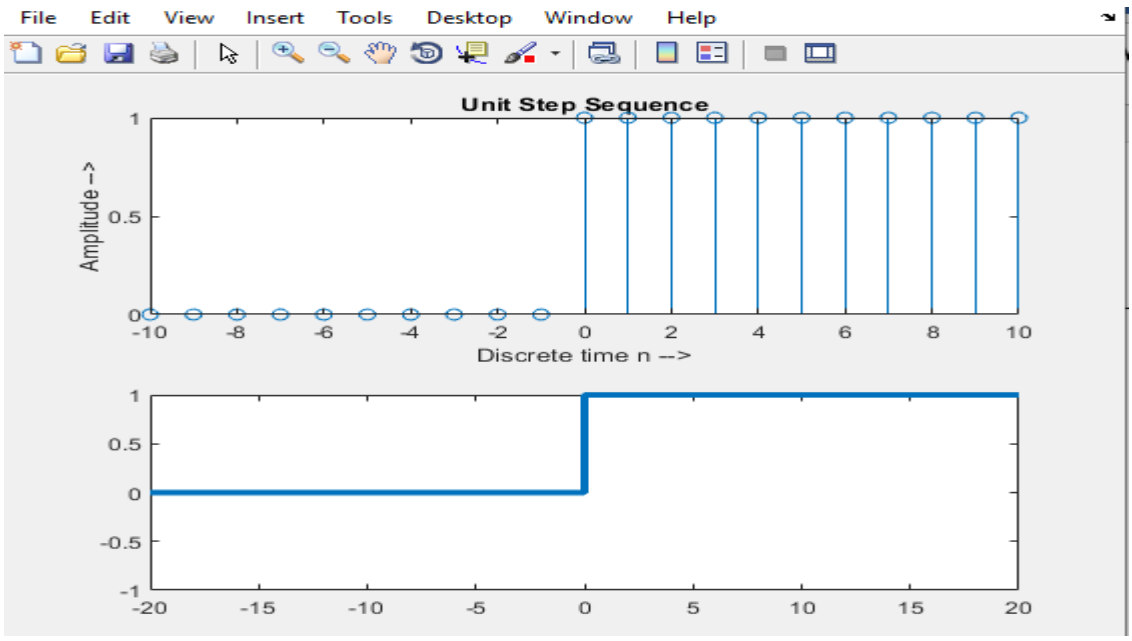
Corresponding code:

```
clc;
close all;
clear all;

%Unit Step function for discrete time signal
n=-10:1:10;
step=[zeros(1,10),ones(1,11)];
subplot(2,1,1)
stem(n,step);
xlabel('Discrete time n -->'); ylabel('Amplitude -->');
title('Unit Step Sequence');

%Unit Step function for continuous time signal
t = -20:0.001:20;
y = heaviside(t);
subplot(2,1,2);
plot(t,y,'Linewidth',3);
axis([-20 20 -1 1]);
subplot(2,1,2);
```

Output:



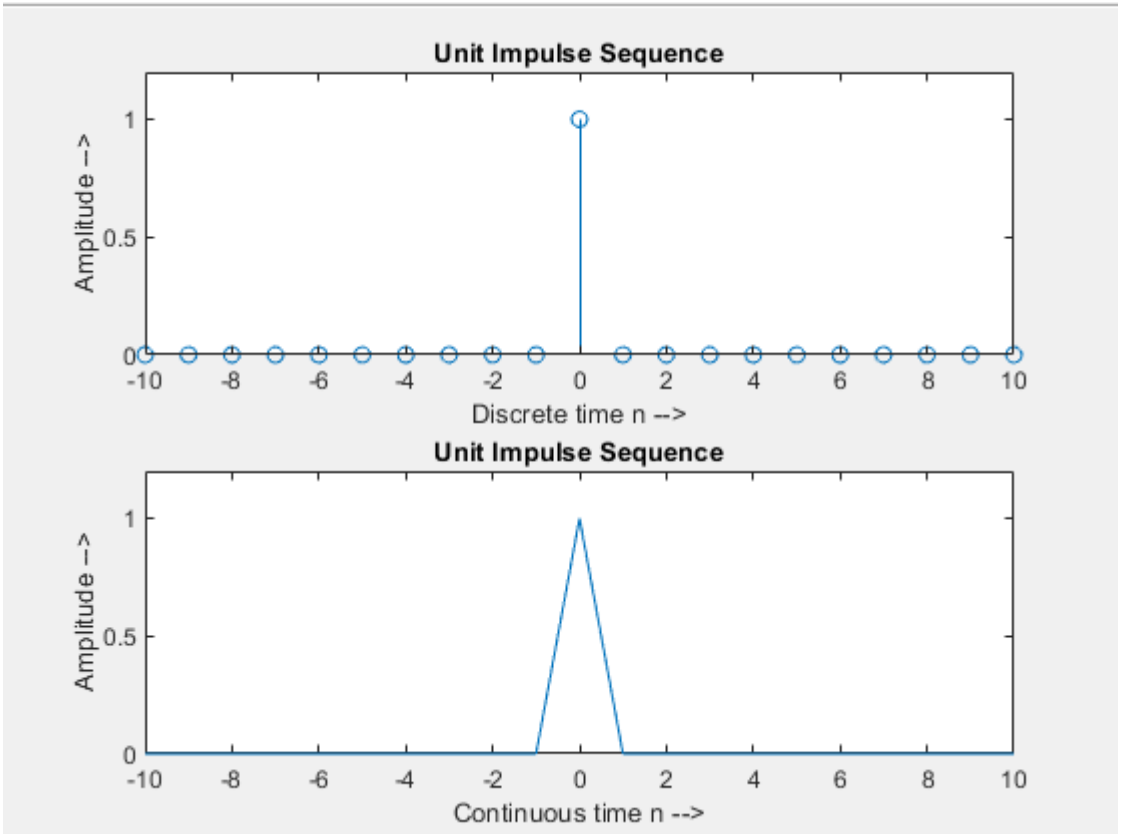
ii. Impulse function:
Corresponding code:

```
clc;
close all;
clear all;

%Unit impulse sequence for discrete time signal
n=-10:1:10;
impulse=[zeros(1,10),ones(1,1),zeros(1,10)];
subplot(2,1,1); stem(n,impulse);
xlabel('Discrete time n -->'); ylabel('Amplitude -->');
title('Unit Impulse Sequence');
axis([-10 10 0 1.2]);

%Unit impulse sequence for continuous time signal
n= -10:10;
u = [zeros(1,10) 1 zeros(1,10)];
subplot(2,1,2);
plot(n,u);
xlabel('Continuous time n -->'); ylabel('Amplitude -->');
title('Unit Impulse Sequence');
axis([-10 10 0 1.2]);
```

Output:



iii. Exponential Sequence:
Corresponding code:

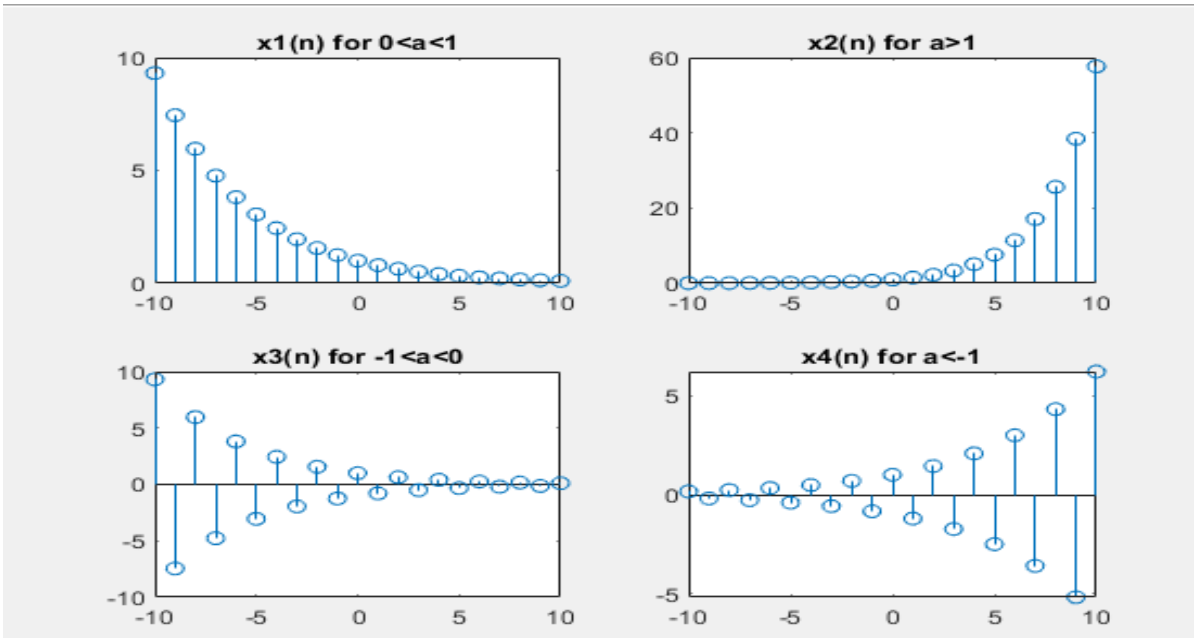
```
clc;
close all;
clear all;
n = -10:1:10;
%Exponential function for discrete time signal
% for 0<a<1
a=0.8;
x1 = a.^n;
subplot(2,2,1); stem(n,x1);
title('x1(n) for 0<a<1');

%for a>1
a=1.5;
x2 = a.^n;
subplot(2,2,2); stem(n,x2);
title('x2(n) for a>1');

% for -1<a<0
a=-0.8;
x3 = a.^n;
subplot(2,2,3); stem(n,x3);
title('x3(n) for -1<a<0');

% for a<-1
a=-1.2;
x4 = a.^n;
subplot(2,2,4); stem(n,x4);
title('x4(n) for a<-1');
```

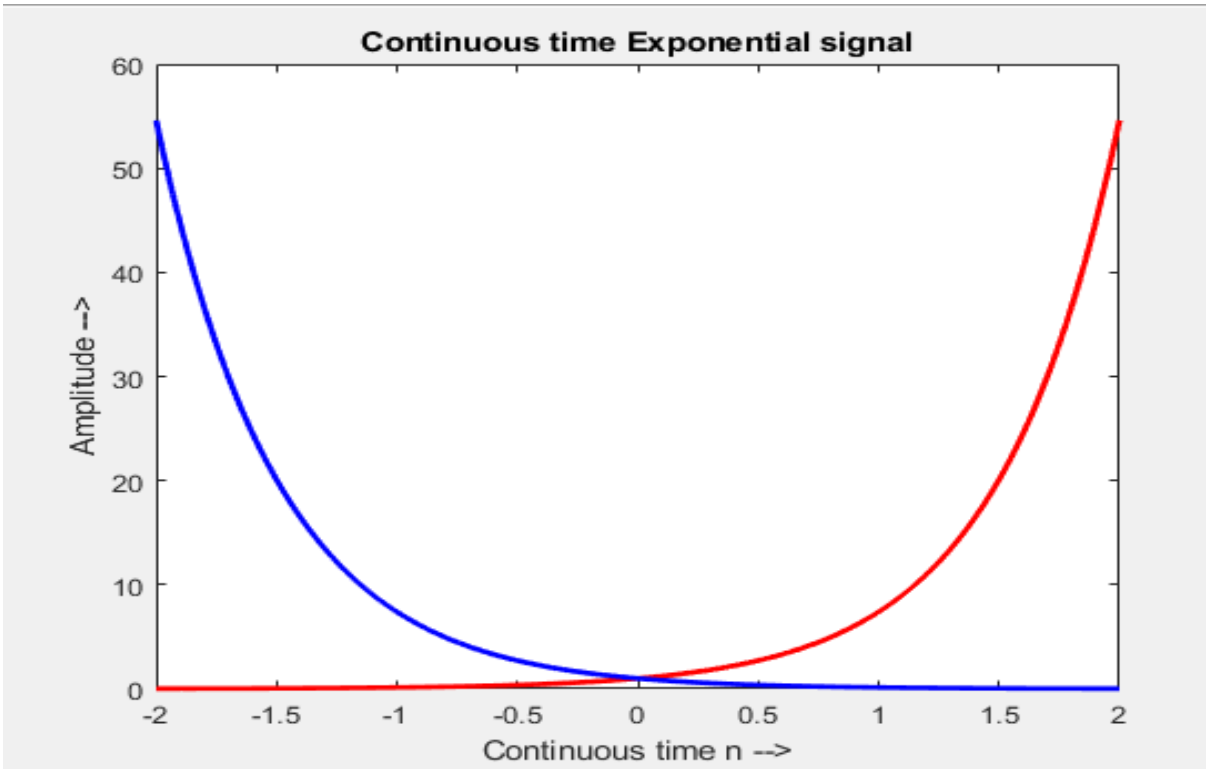
Output:



Corresponding code:

```
clc;
close all;
clear all;
%Exponential function for continuous time signal
t = -2:0.01:2;
sig1 = 2;
sig2 = -2;
x1 = exp(sig1*t);
x2 = exp(sig2*t);
plot(t,x1,'r',t,x2,'b','lineWidth',2);
xlabel('Continuous time n -->'); ylabel('Amplitude -->');
title('Continuous time Exponential signal');
```

Output:



iv. Ramp function:

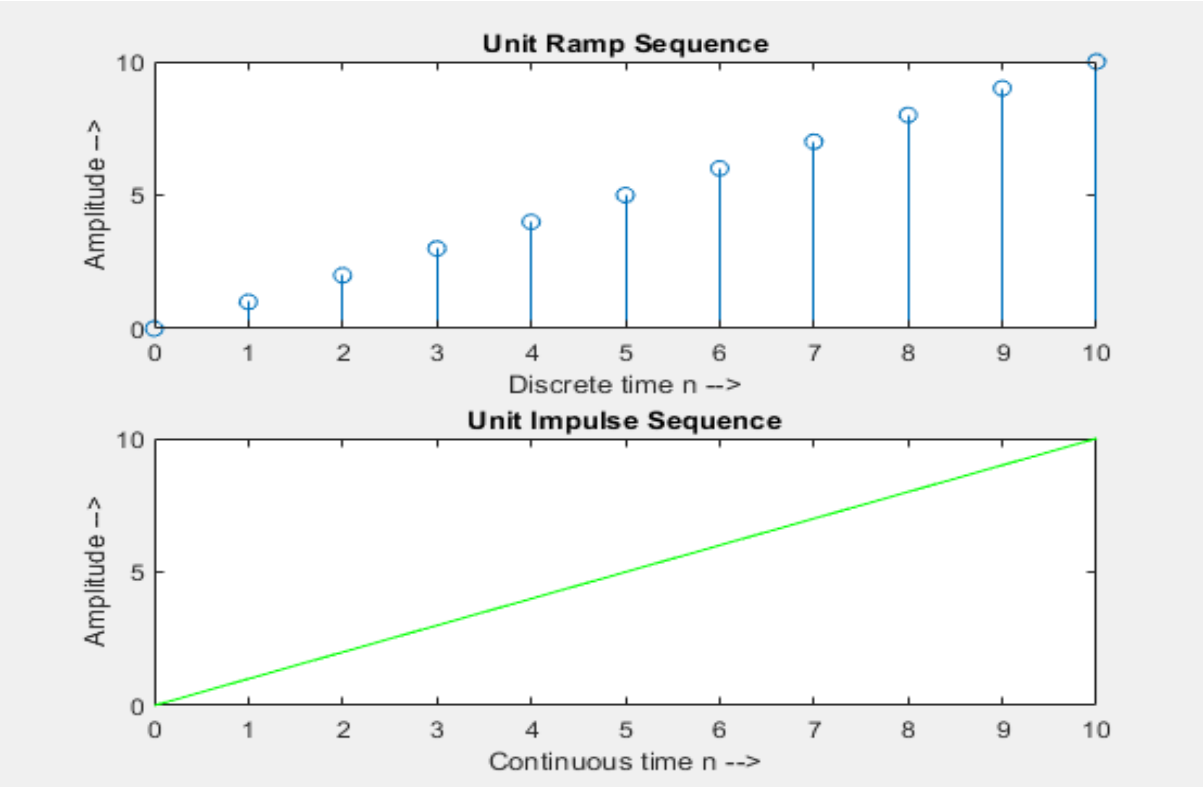
Corresponding code:

```
clc;
close all;
clear all;
%Ramp function for discrete time signal
n=0:1:10;
ramp=n;
subplot(2,1,1); stem(n,ramp);
xlabel('Discrete time n -->'); ylabel('Amplitude -->');
```

```
title('Unit Ramp Sequence');

%Ramp function for continuous time signal
t = -10:10;
u = [zeros(1,10)  ones(1,11)];
r = t.*u;
subplot(2,1,2);
plot(t,r,'g');
xlabel('Continuous time n -->'); ylabel('Amplitude -->');
title('Unit Impulse Sequence');
axis([0 10 0 10]);
```

Output:



v. Sine function:

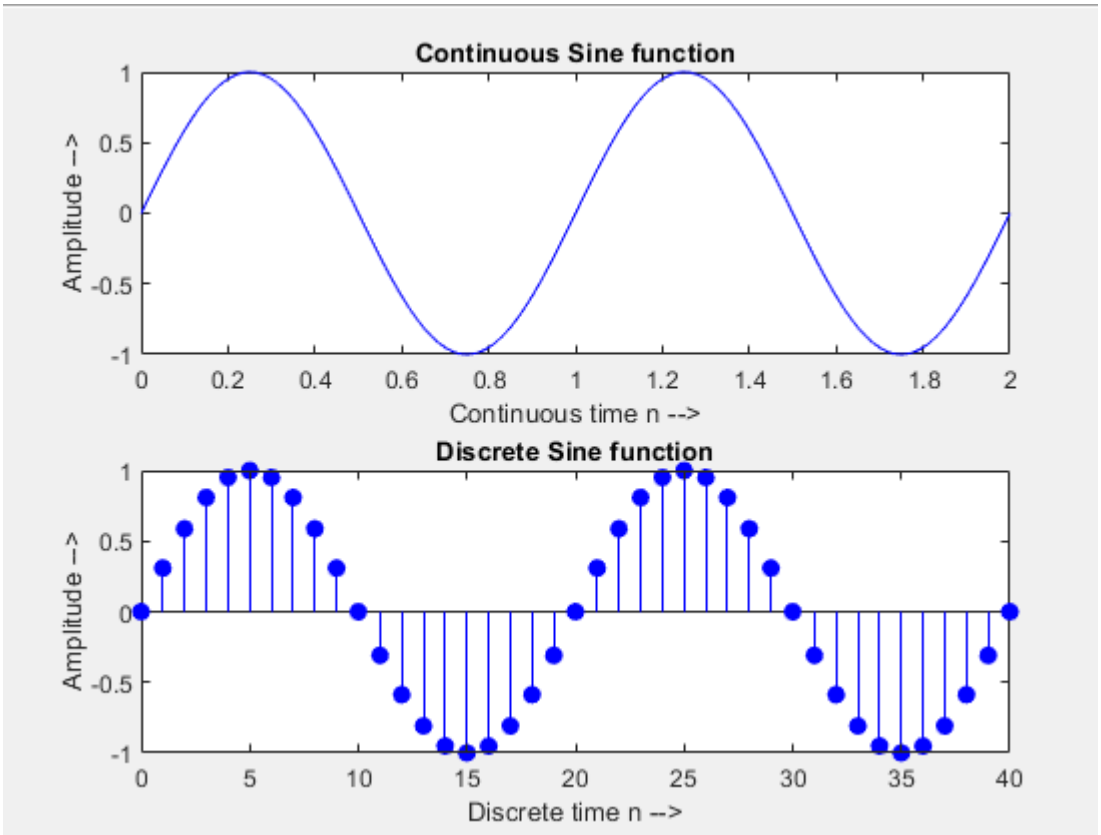
Corresponding code:

```
clc;
close all;
clear all;
%Sine function for continuous time signal

t = 0:0.01:2;
y=sin(2*pi*t);
subplot(2,1,1); plot(t,y,'b');
xlabel('Continuous time n -->'); ylabel('Amplitude -->');
title('Continuous Sine function');
```

```
%Sine function for discrete time signal
n=0:1:40;
y=sin(.1*pi*n);
subplot(2,1,2);
stem(n,y,'b','filled');
xlabel('Discrete time n -->'); ylabel('Amplitude -->');
title('Discrte Sine function');
```

Output:



Discussion: After completing this experiment, we have learnt, about how to plot different types of elementary functions of discrete and continuous signal using Matlab.