



Rajshahi University of Engineering & Technology, Rajshahi

COURSE TITLE- Digital Signal Processing Sessional

COURSE NO- ECE 4124

18 SERIES

Submitted By:

Name: Israt Zahan

ROLL: 1810057

Dept. of Electrical & Computer Engineering

RUET

Submitted To:

Hafsa Binte Kibria

Lecturer

Dept. of Electrical & Computer Engineering

RUET

Experiment No: 01

Experiment Name: Plotting some of signals –

- Plot unit step, unit impulse and unit ramp signal using conditions.
- Plot a discrete signal.
- Plot two discrete signal, their addition and subtraction.
- Plot two given continuous signal.

Experiment Date: 20/03/23

Theory:

Here there are some signals that's are unit step, unit impulse, unit ramp, discrete signal, continuous signal. A discrete signal is a sequence of values of interest, where the integer index can be thought of as a time index, and the values in the sequence represent some physical quantity of interest. And a continuous signal is a type of signal that varies smoothly and continuously over time.

The step signal or step function is that type of standard signal which exists only for positive time and it is zero for negative time. If a step signal has unity magnitude, then it is known as unit step signal or unit step function. The unit impulse signal has zero amplitude everywhere except at the origin where $t = 0$. At the origin the amplitude of impulse signal is infinity so that the area under the curve is unity. A ramp function or ramp signal is a type of standard signal which starts at $t = 0$ and increases linearly with time. The unit ramp function has unit slope.

Required Software: MATLAB

Code:

- **Unit step, unit impulse and unit ramp-**

```
clc;
clear all;
close all;

t=-10:0.01:10;

step1= t>= 0;
subplot(3,1,1);
plot(t,step1);
xlabel('Time');
ylabel('Amplitude');
title('Unit step');

impulse=t==0;
subplot(3,1,2);
plot(t,impulse);
```

```

xlabel('Time');
ylabel('Amplitude');
title('Unit Impluse');

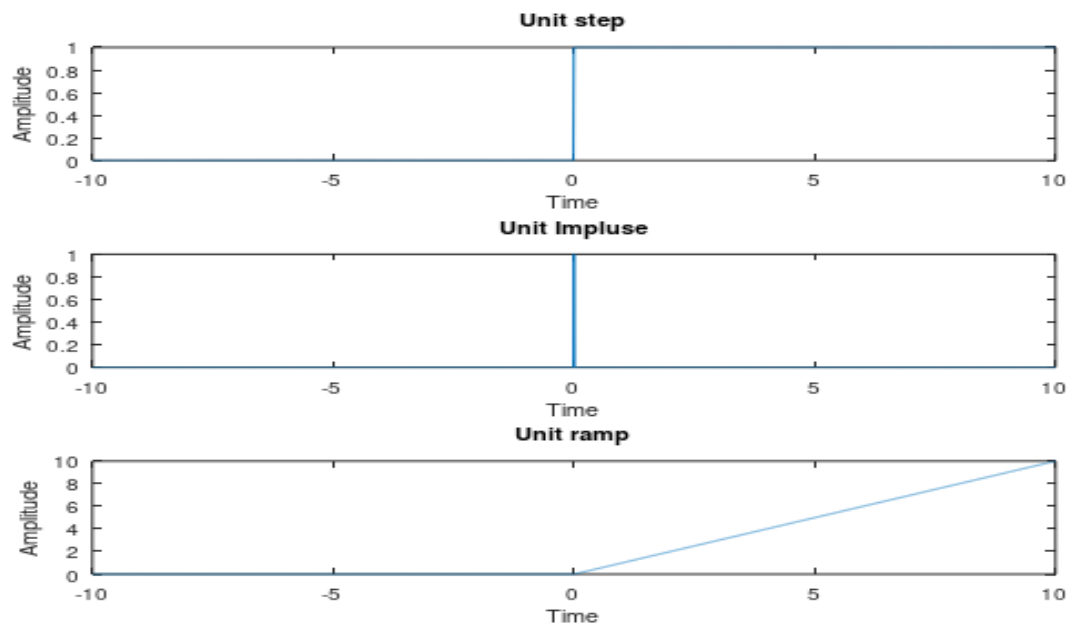
```

```

ramp=t.*step1;
subplot(3,1,3);
plot(t,ramp);
xlabel('Time');
ylabel('Amplitude');
title('Unit ramp');

```

Output:



- **Discrete signal –**

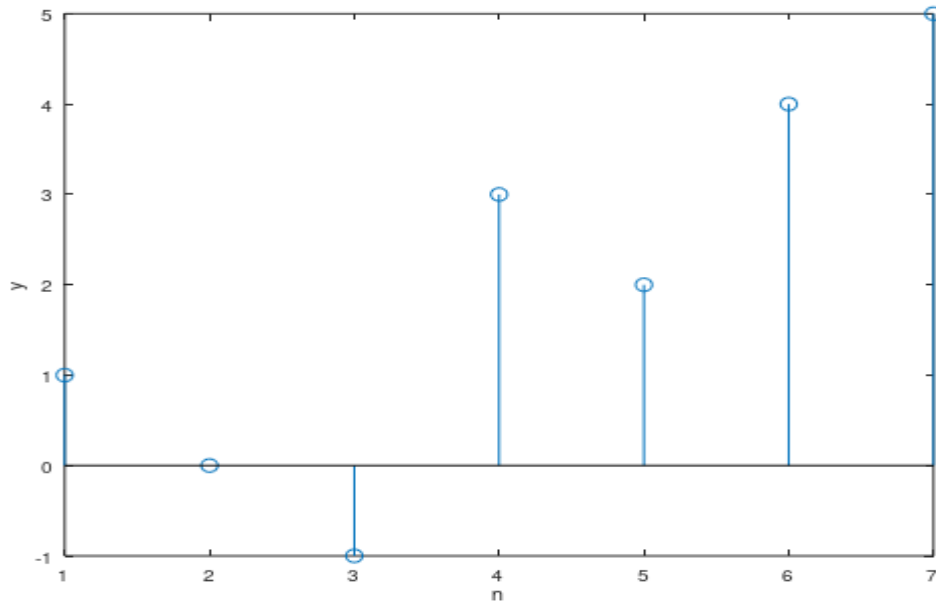
```

clc;
clear all;
close all;

y=[1, 0, -1, 3, 2, 4, 5];
n=[1 2 3 4 5 6 7];
stem(n,y);
xlabel('n');
ylabel('y');

```

Output:



- **Two different signals, their addition and subtraction-**

```
clc;
clear all;
close all;

t=-20:1:20;

step1= t>=0 & t<=10;
subplot(4,1,1);
stem(t,step1);
xlabel('Time');
ylabel('Amplitude');
title('First signal');

step2= t>=5 & t<=15;
subplot(4,1,2);
stem(t,step2);
xlabel('Time');
ylabel('Amplitude');
title('Second signal');

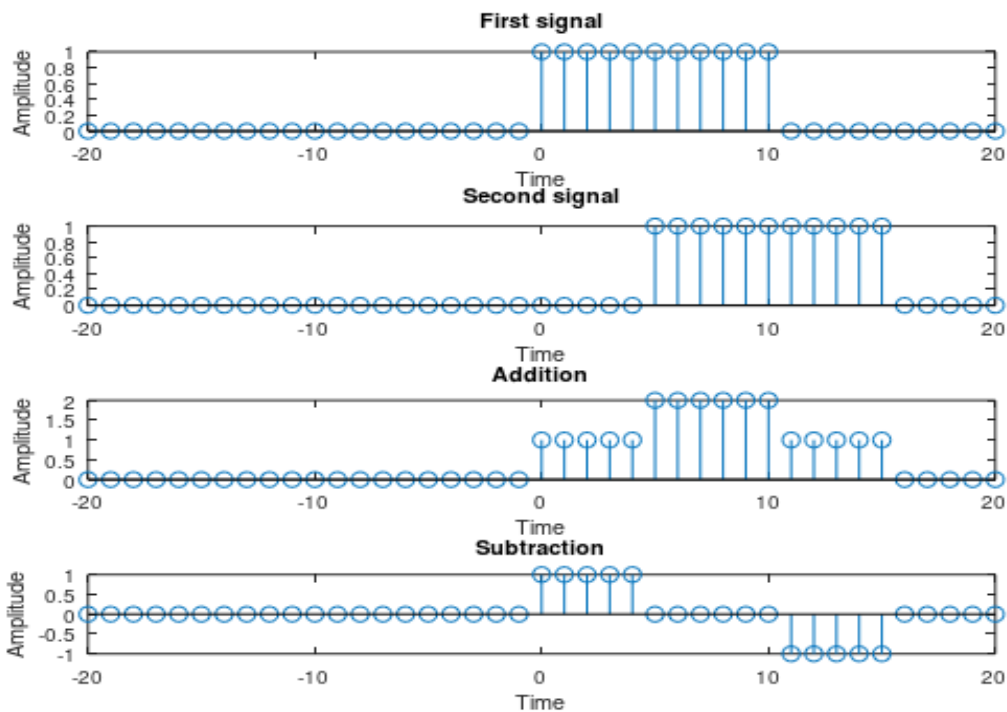
step3 = step1+step2;
subplot(4,1,3);
stem(t,step3);
xlabel('Time');
ylabel('Amplitude');
title('Addition');
```

```

step4 = step1-step2;
subplot(4,1,4);
stem(t,step4);
xlabel('Time');
ylabel('Amplitude');
title('Subtraction');

```

Output:



- **Plotting two continuous signal-**

```

clc;
clear all;
close all;

t=0:1:7;
x = [ones(1,1).*1 ones(1,2).*2 ones(1,1).*4 ones(1,1).*4 ones(1,2).*2
ones(1,1)];
subplot(2,1,1);
plot(t,x);
xlabel('Time');
ylabel('Amplitude');
title('First Signal');

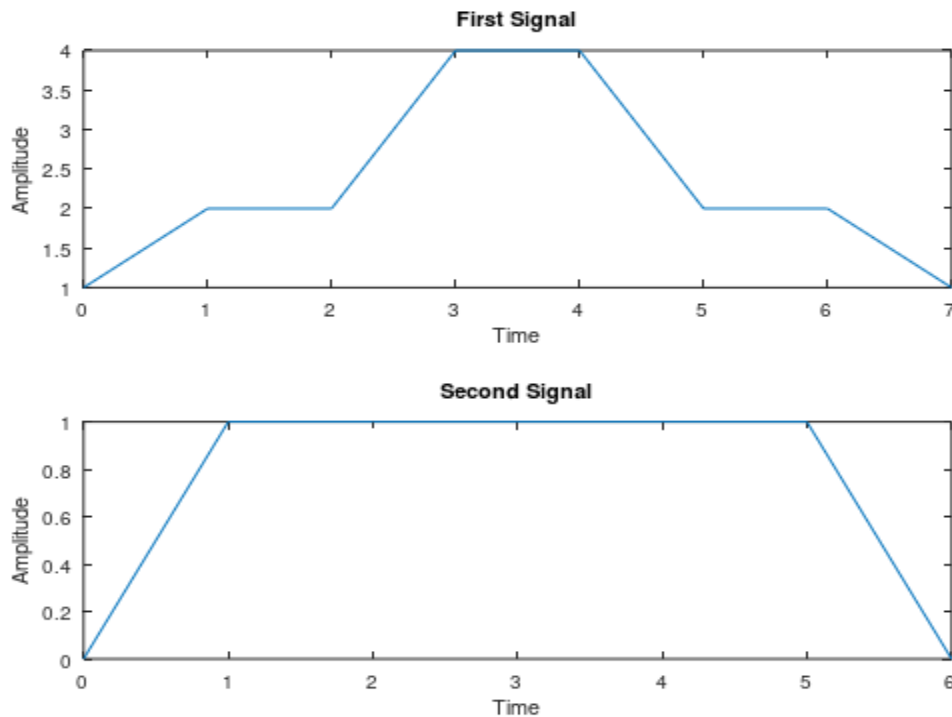
```

```

t=0:1:6;
y = [zeros(1,1) ones(1,5) zeros(1,1)];
subplot(2,1,2);
plot(t,y);
xlabel('Time');
ylabel('Amplitude');
title('Second Signal');

```

Output:



Discussion:

In this experiment I plotted unit step signal, unit impulse signal, ramp signal & two discrete signal and their addition & subtraction, and two continuous signal. Here for unit step signal when time is negative then all values are zero & when time is positive all are one. For impulse when time=0 we got one value but otherwise zero values. Here discrete plot was done by using stem function & worked with two different signals, add & sub them. And at the last plotted the two given signals we have used ones and zeros to create functions.

Conclusion: All the desired outputs were achieved successfully.