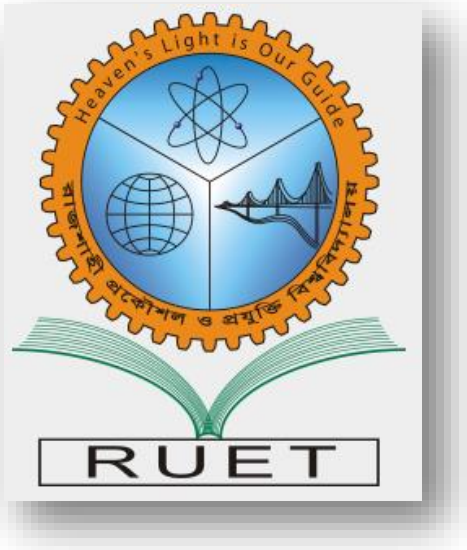

Department of Electrical & Computer Engineering

Course No: ECE 4124

Course Title: Digital Signal Processing Sessional

Experiment No: 01

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Experiment No: 01

Experiment Name:

1. **Plotting Unit Step, Unit Impulse, Unit Ramp**
2. **Plotting Discrete Signal**
3. **Plotting and Addition and Subtraction of two different discrete signal**
4. **Plotting two different continuous signals**

Theory: A continuous-time signal is one that changes smoothly and continuously across time. These signals describe a quantity of interest that is modified by an independent variable, typically time.

A discrete-time signal is a sequence of values of interest, with the integer index serving as a time index and the values in the sequence representing a physical quantity of interest.

The step signal, also known as the step function, is a sort of standard signal that exists only in positive time and is zero in negative time. When a step signal has a magnitude of one, it is referred to as a unit step signal or unit step function.

Except at t = 0, the amplitude of the unit impulse signal is zero. The amplitude of the impulse signal is infinite at the origin (t = 0), hence the area under the curve is one.

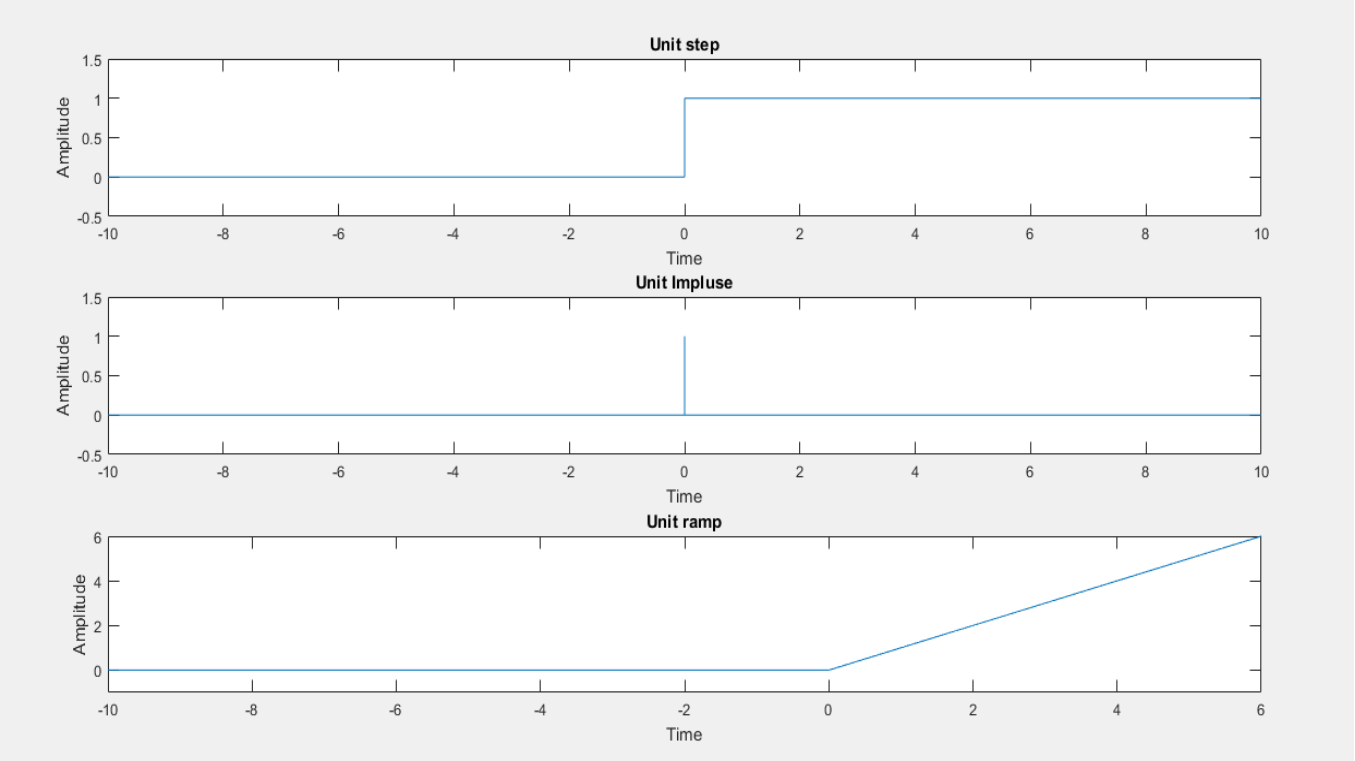
A ramp function, often known as a ramp signal, is a sort of standard signal that begins at t = 0 and climbs linearly over time. The slop of the unit ramp function is one unit.

Required Software: MATLAB

Code: Unit Step, Unit Impulse, Unit Ramp

```
clc;
clear all;

t=-10:0.001:10;
step1= t>= 0;
step2= t==0;
step3= (t>=0).*t;

subplot(3,1,1);
plot(t,step1);
xlabel('Time');
ylabel('Amplitude');
title('Unit step');
ylim([-0.5,1.5]);

subplot(3,1,2);
plot(t,step2);
xlabel('Time');
ylabel('Amplitude');
title('Unit Impluse');
ylim([-0.5,1.5]);

subplot(3,1,3);
plot(t,step3);
xlabel('Time');
ylabel('Amplitude');
title('Unit ramp');
ylim([-1,6]);
```

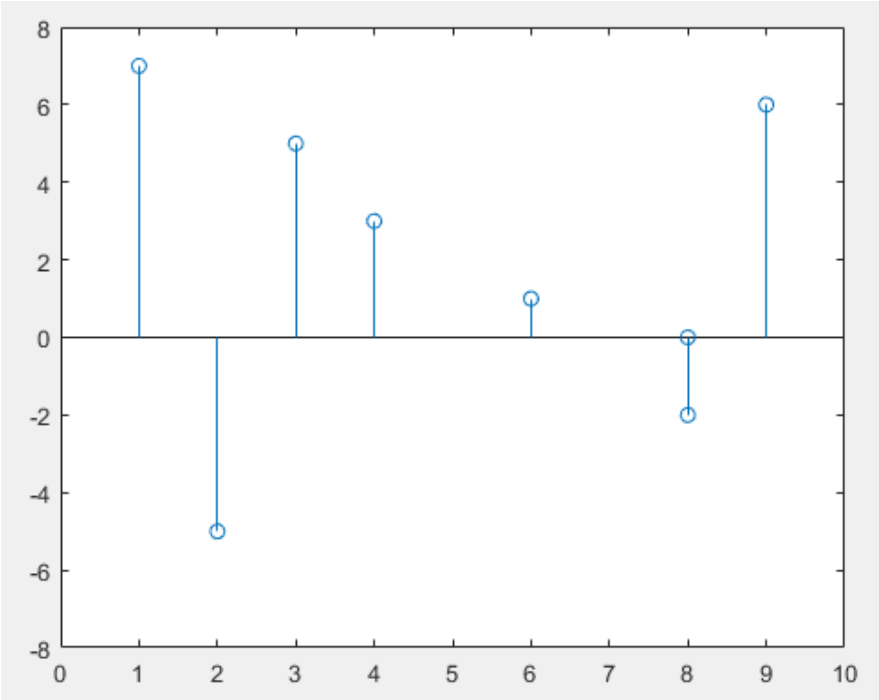
Output:



Code: Discrete Signal

```
clc;
clear all;

x = [1, 0, -5, 7, 5, -2, 6, 3];
y = [6 8 2 1 3 8 9 4];

stem(y,x);
xlim([0, 10]);
ylim([-8, 8]);
```

Output:

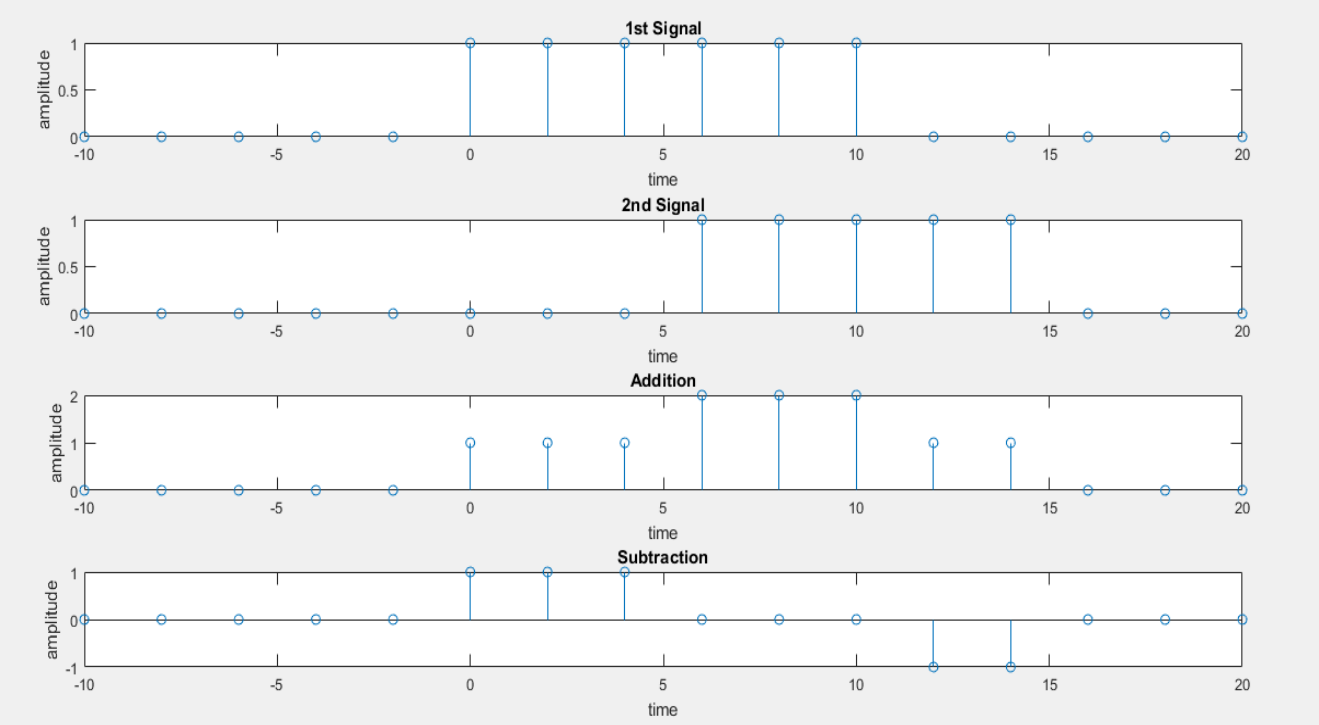


Code: Addition and Subtraction of two different discrete signal

```
clc
clear all

t = -10:2:20

n1 = t>=0 & t<=10;
subplot(4,1,1);
stem(t,n1);
xlabel('time');
ylabel('amplitude');
title('1st Signal');

n2 = t>=5 & t<=15;
subplot(4,1,2);
stem(t,n2);
xlabel('time');
ylabel('amplitude');
title('2nd Signal');
```

```
add = n1+n2;

subplot(4,1,3);
stem(t,add);
xlabel('time');
ylabel('amplitude');
title('Addition');

sub = n1-n2;

subplot(4,1,4);
stem(t,sub);
xlabel('time');
ylabel('amplitude');
title('Subtraction');
```

Output:



Code: Plotting two different continuous signals

```
clc;
clear all;

t=0:1:7;
u = [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,u);
xlabel('Time');
ylabel('Amplitude');
title('Signal 1');

t = 0:1:6;
ul = [zeros(1,1) ones(1,5) zeros(1,1)];

subplot(2,1,2);
plot(t,ul);
xlabel('Time');
ylabel('Amplitude');
title('Signal 2');
```

Output: