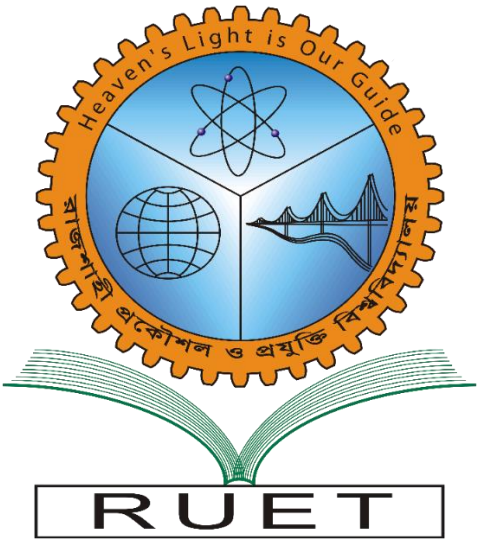
Heaven's Light is Our Guide

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY



Department of Electrical & Computer Engineering

Course Title : Digital Signal Processing Sessional

Course No. : ECE 4124

Experiment No. : 01

Experiment Name : Plotting Signals in MATLAB.

Experiment Date : 20 March, 2023

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1.1) Experiment No.: 01

1.2) Experiment Date: 20 March, 2023

1.3) Name of the Experiment:

i) Plot Unit-Step, Ramp, Unit Impulse signal using MATLAB.
ii) Plot two different discrete signal and show their addition and subtraction using MATLAB.
iii) Plot two different continuous signal and show their addition and subtraction using MATLAB.

1.4) Theory:

Continuous Signal: A continuous signal is a signal that varies continuously over time or space. It is represented by a continuous function, and can take on any value within a given range.

Discrete Signal: A discrete signal is a signal that is defined only at discrete points in time or space. It is represented by a sequence of values, where each value corresponds to a specific time or location.

Unit Step Function: The unit step function, also known as the Heaviside step function, is a mathematical function that is denoted as u(t) or u(x). It is a function of time (t) or a variable (x) that returns 0 for negative inputs and 1 for non-negative inputs.

Ramp Function: The ramp function is a function that increases linearly with time. It is often denoted as r(t) or r(x), where t represents time and x represents some other variable.

Unit Impulse Function: The unit impulse function, also known as the Dirac delta function, is a mathematical function that is used to model a very short, very high amplitude pulse

1.5) Code & Output:

i) Code for plotting Unit-Step, Ramp, Unit-Impulse signal:

```
clear all;
clc;
%unit
t=-10:1:10;
step=t>=0;
stem(t,step)
title('Unit Step')
subplot(3,1,1);

%Impulse
step1=t==0;
stem(t,step1)
title('Unit Impulse')
subplot(3,1,2);

%RAMP
step2=t;
step3=t>0;
step4=step2.*step3;

stem(t,step4)
title('Ramp')
subplot(3,1,3);
```

Output:

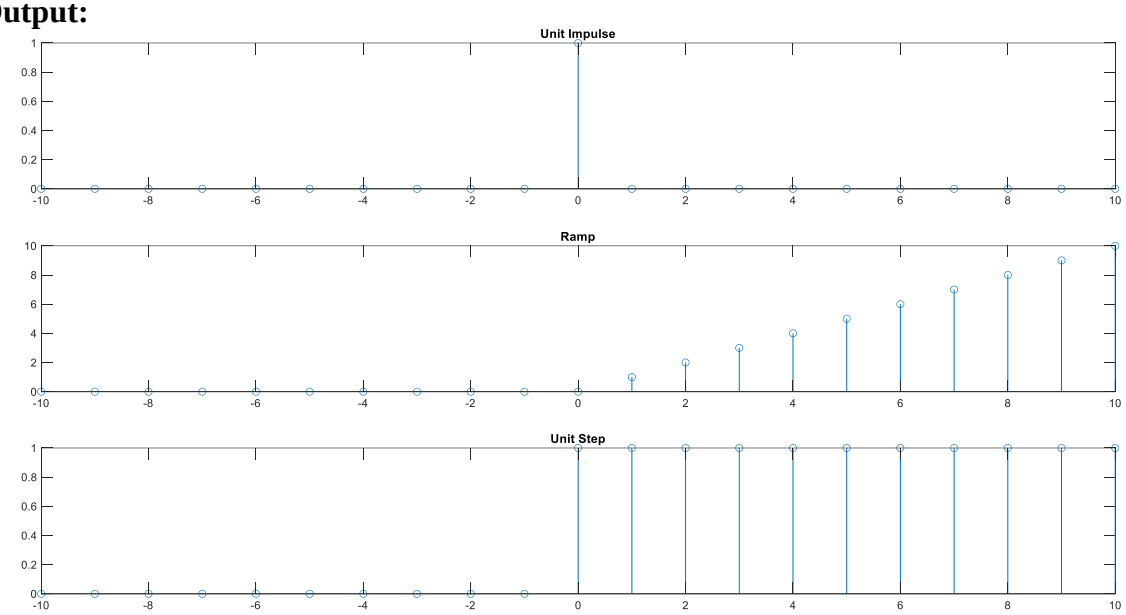

Figure1: Unit Impulse, Ramp and Unit Step Signal

ii) Code for plotting two different discrete signal and show their addition and subtraction:

```
clear all;
clc;
t=-20:1:20;
y=zeros(size(t));
for i=21:31
    y(i)=1;
end
stem(t,y)
title('1st')
subplot(4,1,1);

t=-20:1:20;
y1=zeros(size(t));
for i=26:36
    y1(i)=1;
end
stem(t,y1)
title('2nd')
subplot(4,1,2);

y2=y+y1;
stem(t,y2)
title('Addition')
subplot(4,1,3);

y3=y-y1;
stem(t,y3)
title('Substration')
subplot(4,1,4);
```

Output:

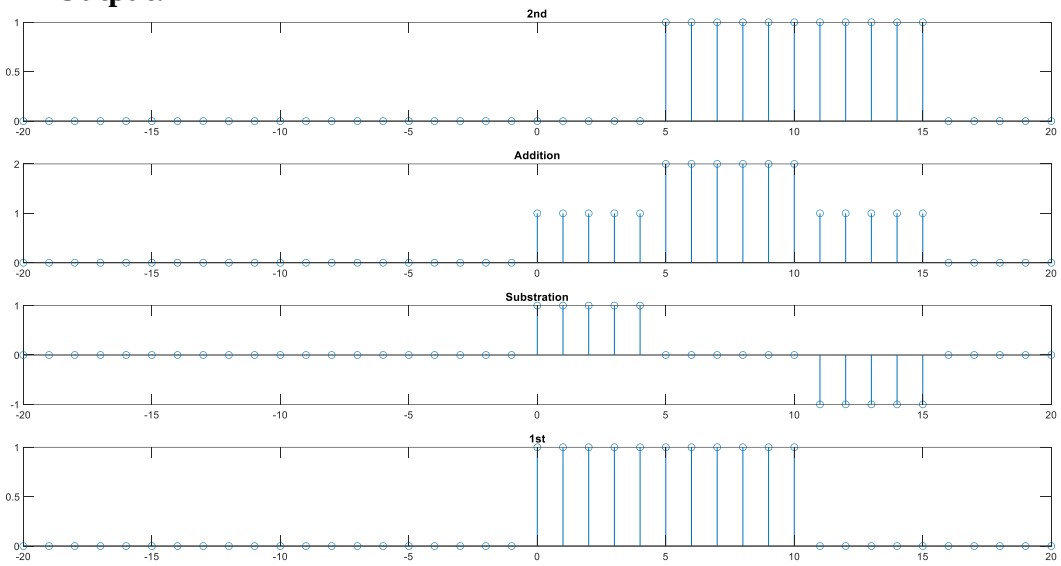

Figure2: Plotting two different discrete signals

iii) Code for plotting two different continuous signals and their addition & subtraction:

```
clear all;
clc;
t=0:1:7;
x=[1 2 4 4 2 2 2 1];
plot(t,x)
title('1st Signal')
subplot(4,1,1);

x1=[0 3 3 3 3 3 0 0];
plot(t,x1)
title('2nd Signal')
subplot(4,1,2);

x2=x+x1;
plot(t,x2)
title('Addition')
subplot(4,1,3);

x2=x-x1;
plot(t,x2)
title('Substraction')
subplot(4,1,4);
```

Output:

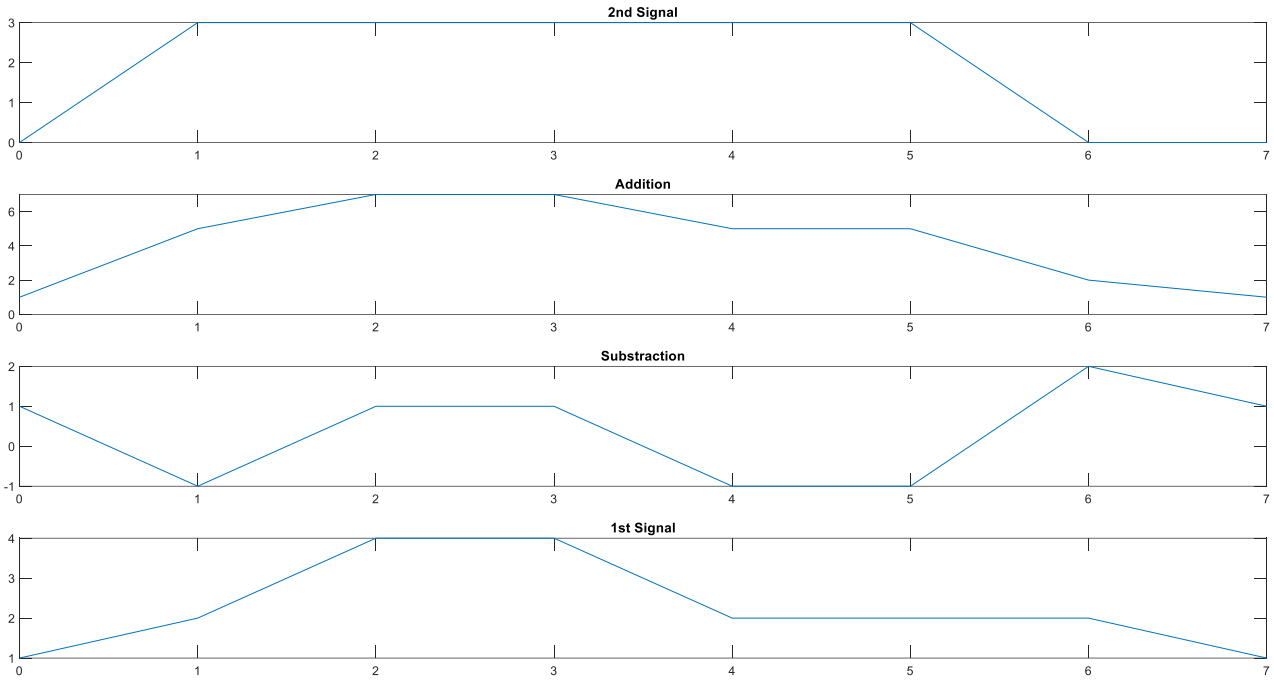

Figure3: Plotting two different Continuous signals

1.6) Discussion & Conclusion:

This experiment is based on MATLAB simulation. Here we have plotted unit step, unit impulse and ramp function. We have added and subtract two continuous and discrete function. The code was successfully executed, and no problems were discovered. We learnt about several sorts of signals and how to plot them using MATALB in this project.