INSTITUTE OF ENGINEERING

ADVANCED COLLEGE OF ENGINEERING AND MANAGEMENT

Kupondole, Lalitpur

(AFFILIATED TO TRIBHUVAN UNIVERSITY)

Lab no:3

Subject: DSAP

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Submitted To:

Department of Computer

and

Electronics Engineering

Lab-3 Elementary signals

Objective:

- To learn about elementary signals and plot them.

Theory

Noise Wave:

A noise wave is the pattern of disturbance caused by the movement of energy traveling through a medium (such as air, water, or any other liquid or solid matter) as it propagates away from the source of the sound.

There are 5 different types of elementary signals: unit step signal, rectangular signal, ramp signal, triangular signal, and impulse signal.

Unit step signal:
Unit step signal is like flipping switch on or off. If t>0 then switch will on, if t<0 will be off. Ku(t), K is constant and is use in ramp signal.

Rectangualar signal:
Rectangular signal is a little more complex than unit step signal. We could say it is combine of two unit step signal. But more importantly there is a theta that we add in to the signal as new unknown.

Unit impulse signal:
An impulse signal is a special signal is to model certain events. Impulse signal is not realizable, the out put of the impulse signal is usually infinity at certain values.

Unit Ramp Signal:
The ramp signal is a unary real signal, whose graph is shaped like a ramp. It can be expressed by numerous definitions, for example "0 for negative inputs, output equals input for non-negative inputs".

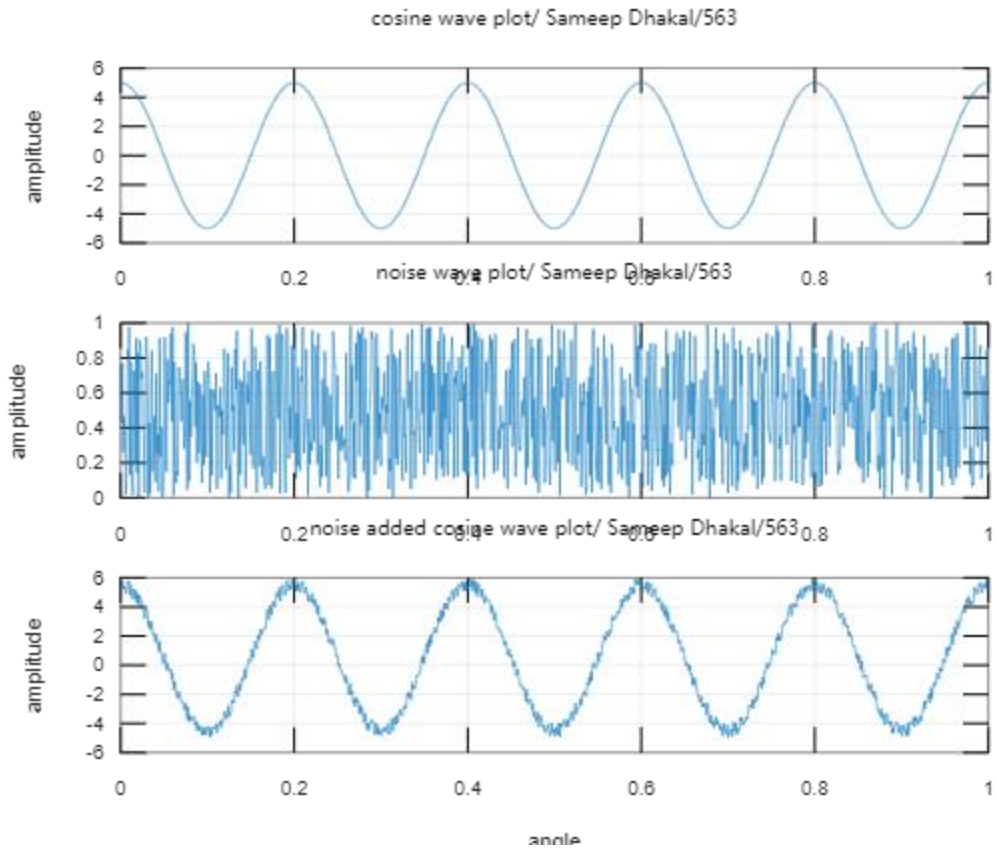
Code:

1. PLOT Cos WAVE, NOISE WAVE AND NOISE ADDED SINE WAVE ALL IN SINGLE SCREEN

```
clc;
clear all;
Amp = 5;
f = 5;
w = 2*pi*f;
```

```
t = 0 : 0.001: 1;
y = Amp * cos(w*t);
subplot(3, 1, 1);
plot(t,y);
grid on;
xlabel('angle');
ylabel('amplitude');
title('cosine wave plot/ Sameep Dhakal/563');
z = rand(1,length(t));
subplot(3,1,2);
plot(t,z);
grid on;
xlabel('angle');
ylabel('amplitude');
title('noise wave plot/ Sameep Dhakal/563');
a = y + z;
subplot(3,1,3);
plot(t,a);
grid on;
xlabel('angle');
ylabel('amplitude');
title('noise added cosine wave plot/ Sameep Dhakal/563');
grid on;
```

Output:

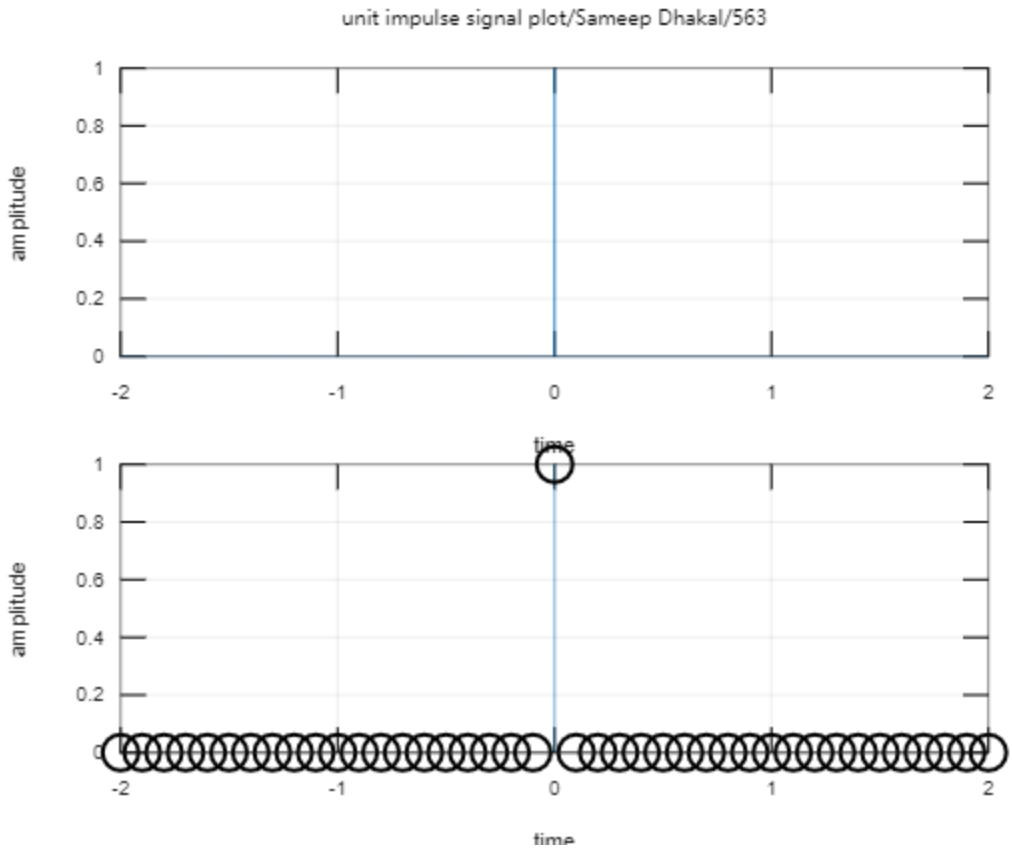


2. Construct both continuous and discrete-time unit impulse signal.

```
clc;
clear all;
i = 1;
for t = -2:0.001:2
   if(t==0)
      x(i) = 1;
   else
      x(i) = 0;
   end;
   i = i +1;
end;
t = -2:0.001:2;
subplot(2,1,1);
plot(t,x);
```

```
grid on;
xlabel('time');
ylabel('amplitude');
title('unit impulse signal plot/Sameep Dhakal/563');
clear all;
i = 1;
for t = -2:0.1:2
   if(t==0)
      x(i) = 1;
   else
      x(i) = 0;
   end;
   i = i +1;
end;
t = -2:0.1:2;
subplot(2,1,2);
stem(t,x);
grid on;
xlabel('time');
ylabel('amplitude');
title('unit impulse signal’);
```

output:

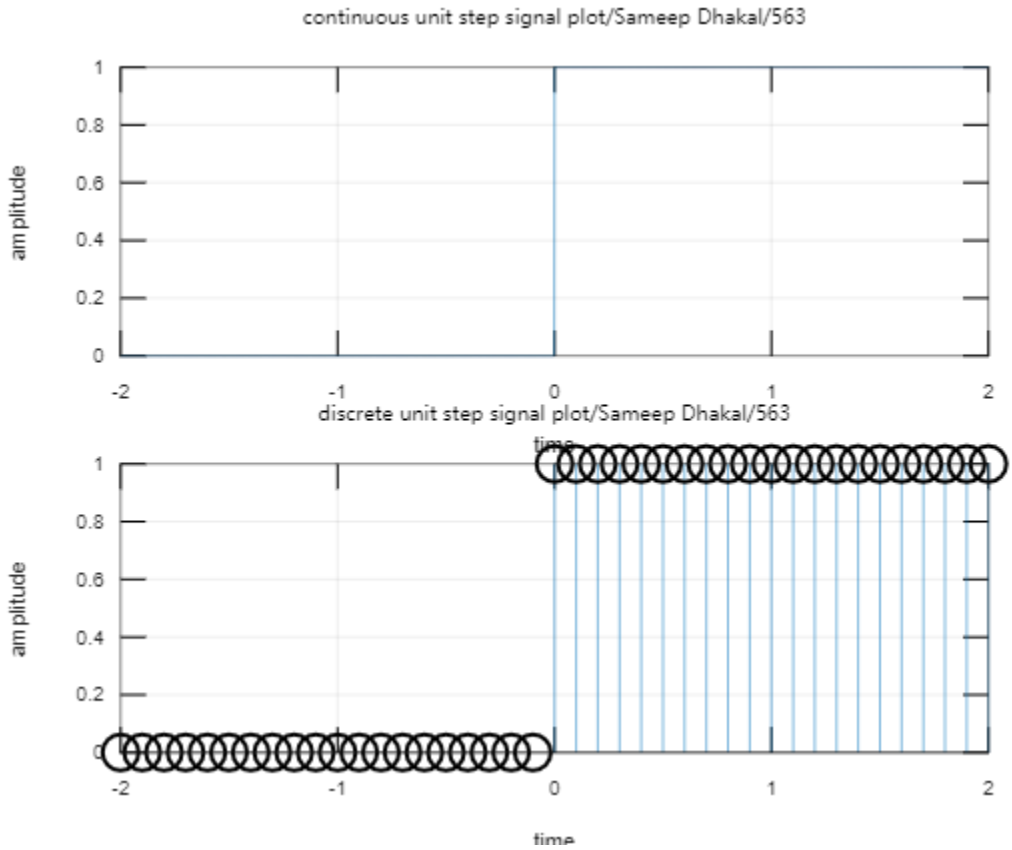


3. Construct both continuous and discrete-time unit step signal.

```
clc;
clear all;
i = 1;
for t = -2:0.001:2
   if(t>=0)
      x(i) = 1;
   else
      x(i) = 0;
   end;
   i = i +1;
end;
t = -2:0.001:2;
subplot(2,1,1);
plot(t,x);
grid on;
xlabel('time');
ylabel('amplitude');
title('continuous unit step signal plot/Sameep Dhakal/563');
```

```
clear all;
i = 1;
for t = -2:0.1:2
   if(t>=0)
      x(i) = 1;
   else
      x(i) = 0;
   end;
   i = i +1;
end;
t = -2:0.1:2;
subplot(2,1,2);
stem(t,x);
grid on;
xlabel('time');
ylabel('amplitude');
title('discrete unit step signal plot/Sameep Dhakal/563');
```

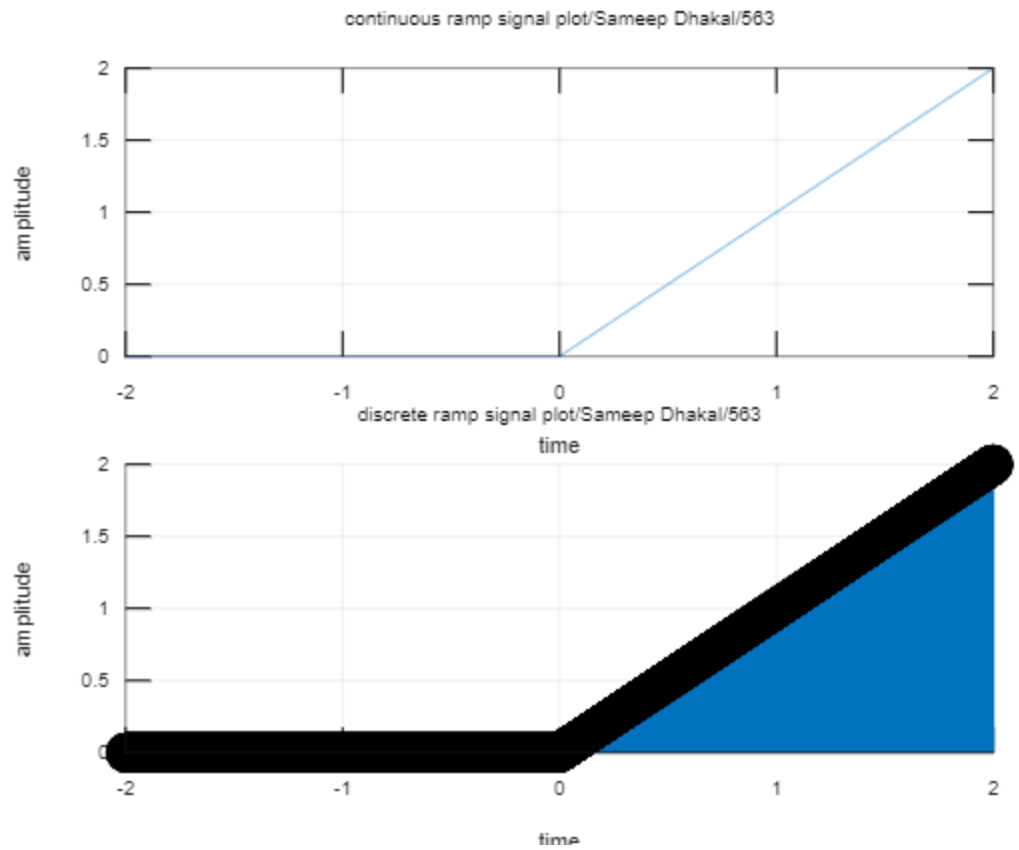
output:



4. Construct both continuous and discrete-time unit ramp signal.

```
clc;
```

```
clc;
clear all;
i = 1;
for t = -2:0.001:2
   if(t>=0)
      x(i) = t;
   else
      x(i) = 0;
   end;
   i = i +1;
end;
t = -2:0.001:2;
subplot(2,1,1);
plot(t,x);
grid on;
xlabel('time');
ylabel('amplitude');
title('continuous ramp signal plot/Sameep Dhakal/563');
i = 1;
for t = -2:0.001:2
   if(t>=0)
      x(i) = t;
   else
      x(i) = 0;
   end;
   i = i +1;
end;
t = -2:0.001:2;
subplot(2,1,2);
stem(t,x);
grid on;
xlabel('time');
ylabel('amplitude');
title('discrete ramp signal plot/Sameep Dhakal/563');
```

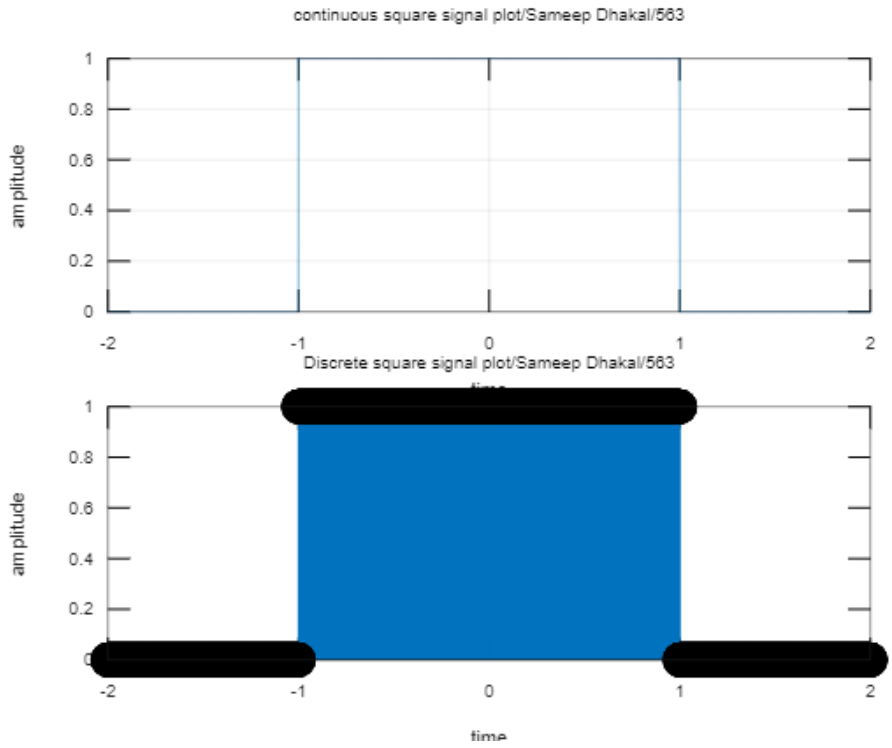


5. Construct a rectangular pulse signal defined by the signal.
   Rect(t)=1, for |t|<1/2
   =1/2, for |t|=1/2
   =0 otherwise

```
clc;
clear all;
i = 1;
for t = -2:0.001:2
   if(abs(t)>1)
      x(i) = 0;
   else
      x(i) = 1;
   end;
   i = i +1;
end;
t = -2:0.001:2;
```

```
subplot(2,1,1);
plot(t,x);
xlabel('time');
ylabel('amplitude');
title('continuous square signal plot/Sameep Dhakal/563');
grid on;
clear all;
i = 1;
for t = -2:0.001:2
   if(abs(t)>1)
      x(i) = 0;
   else
      x(i) = 1;
   end;
   i = i +1;
end;
t = -2:0.001:2;
subplot(2,1,2);
stem(t,x);
xlabel('time');
ylabel('amplitude');
title('Discrete square signal plot/Sameep Dhakal/563');
```

output:



Discussion and conclusion

In this lab we plotted the elementary signals and analyzed their result.