Tribhuvan University

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Lab Report on :

CONVOLUTION OF SIGNALS

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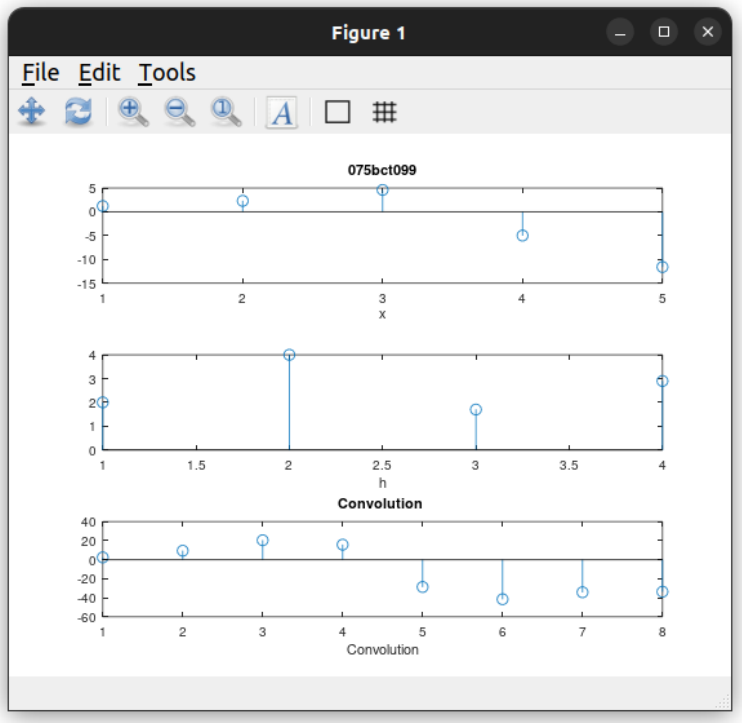
DSAP Lab2 Convolution of signals

a) Convolution of x = [1.2 2.3 4.6 -5 -11.6] and h = [2 4 1.7 2.9];

Code :

```
x = [1.2 2.3 4.6 -5 -11.6];
h = [2 4 1.7 2.9];
y = conv(x,h);
subplot(3,1,1);
stem(x);
xlabel("x");
title('075bct099');
subplot(3,1,2);
stem(h);
xlabel("h");
title('');
subplot(3,1,3);
stem(y);
xlabel("Convolution");
title('Convolution ');
```

Output :

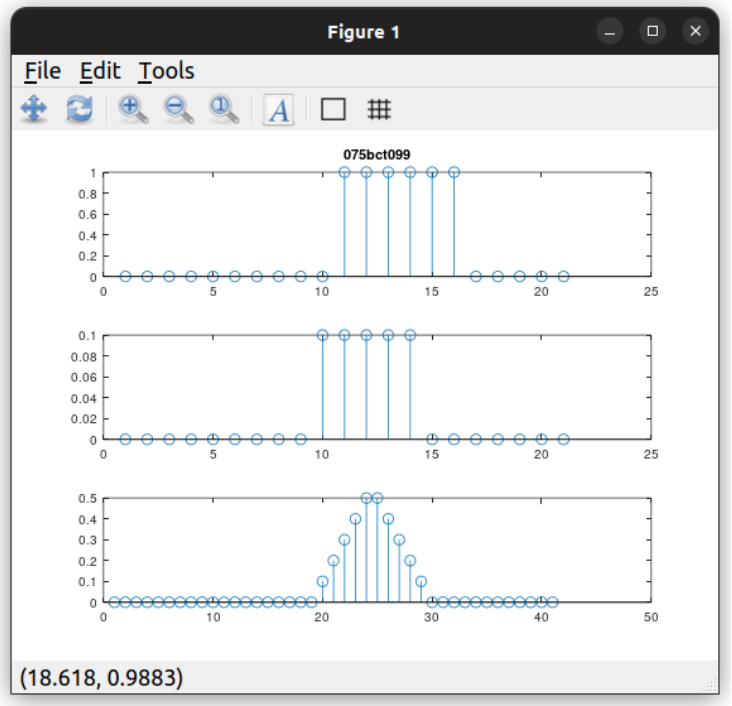


b) Convolution of signals
x = {1 for 0<=n<=5 ;otherwise 0 } and
H = {0.1 for -1<=n<=3 ; otherwise 0}

Code :

```
clc;
n= -10:1:10;
% Empty vector x and h
x = [];
h = [];
for(n = -10:10)
  if(n>= 0 & n<=5)
    x = [x 1];
  else
    x = [x 0];
  end
  if (-1<= n & n<=3)
    h = [h 0.1];
  else
    h = [h 0];
  endif
end

y = conv(x,h);
subplot(311);
stem(x);
title("075bct099");
subplot(312);
stem(h);
subplot(313);
stem(y);
```

Output :



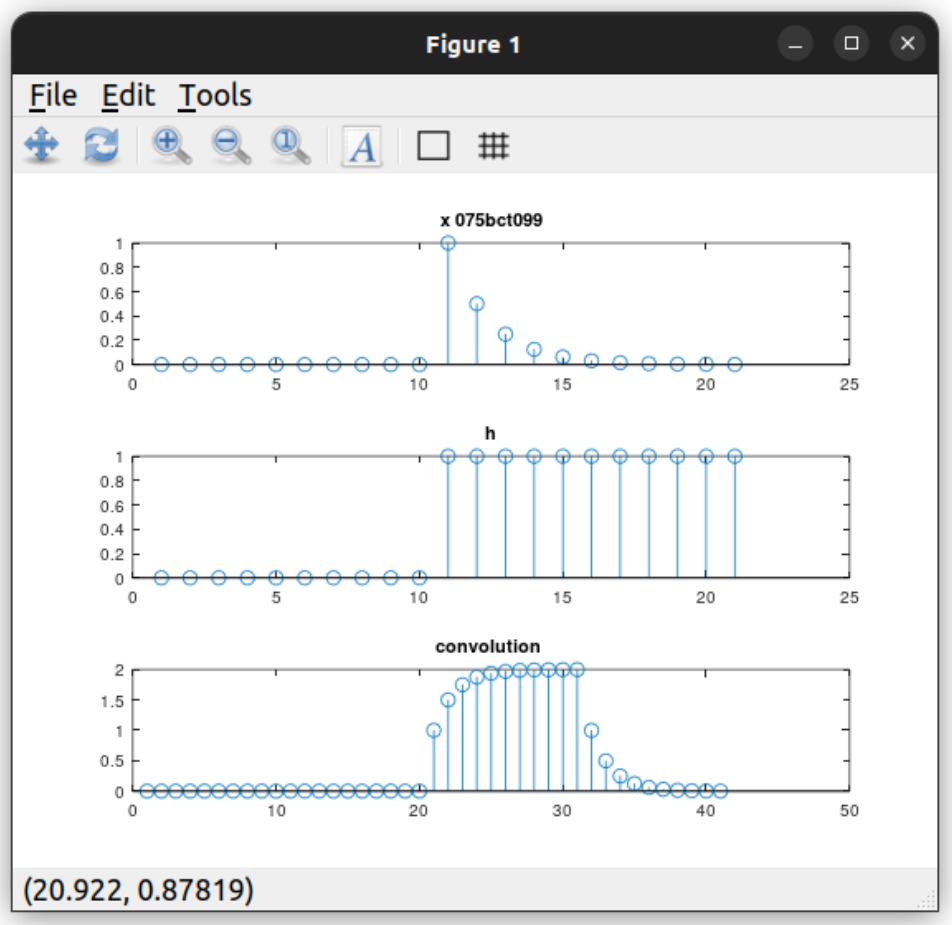
c) Convolution of
x=a^n
h=*u[n]*

Code :

```
clc;
n = -10:10;
x= [];
h = [];
pow =[];

a = input("Input for constant value a bwt 0 and 1 :");
for(n = -10:10)

  if(n >=0)
    h = [h 1];
  else
    h = [h 0];
  end
  pow = [pow a.^n];
end

x= pow.*h;
y = conv(x,h);
subplot(311);
```

```
stem(x);
title("Power signal 075bct099");
subplot(312);
stem(h);
title("h ");
subplot(313);
stem(y);
title("convolution ");
```

Output:



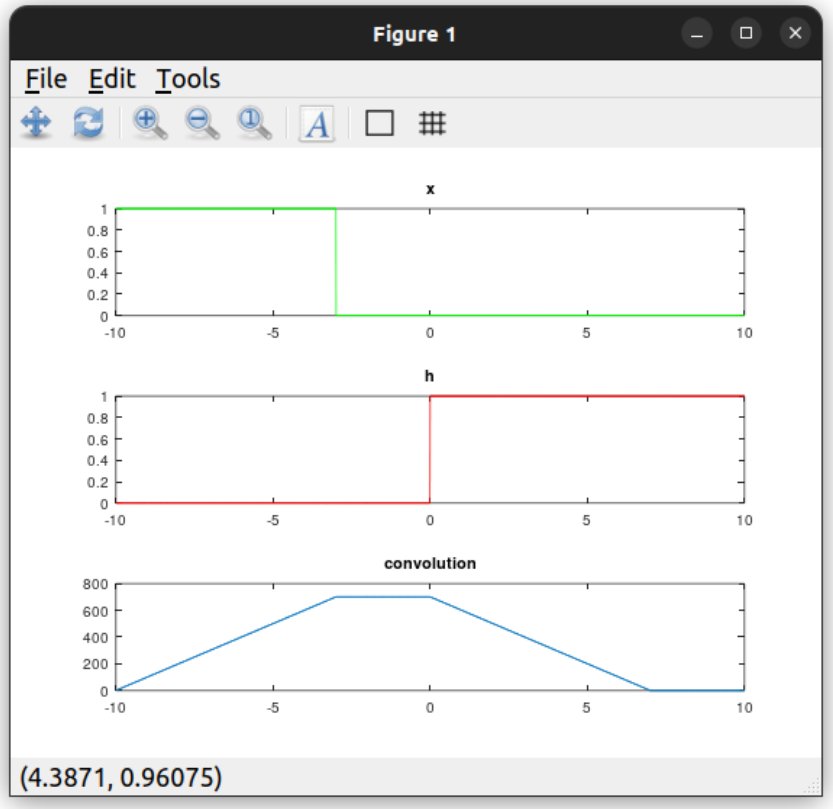
d)

Code:

```
clc;
clear all ;

t = -10: 0.01:10;

h= t>=0;
```

```
x = h - t>=3;

y = conv(x,h , "same");
subplot(311);

plot(t,x , 'g');
title("x");

subplot(312);
plot(t,h , 'r');
title("h");

subplot(313);
plot(t,y);
title("convolution");
```

Output:

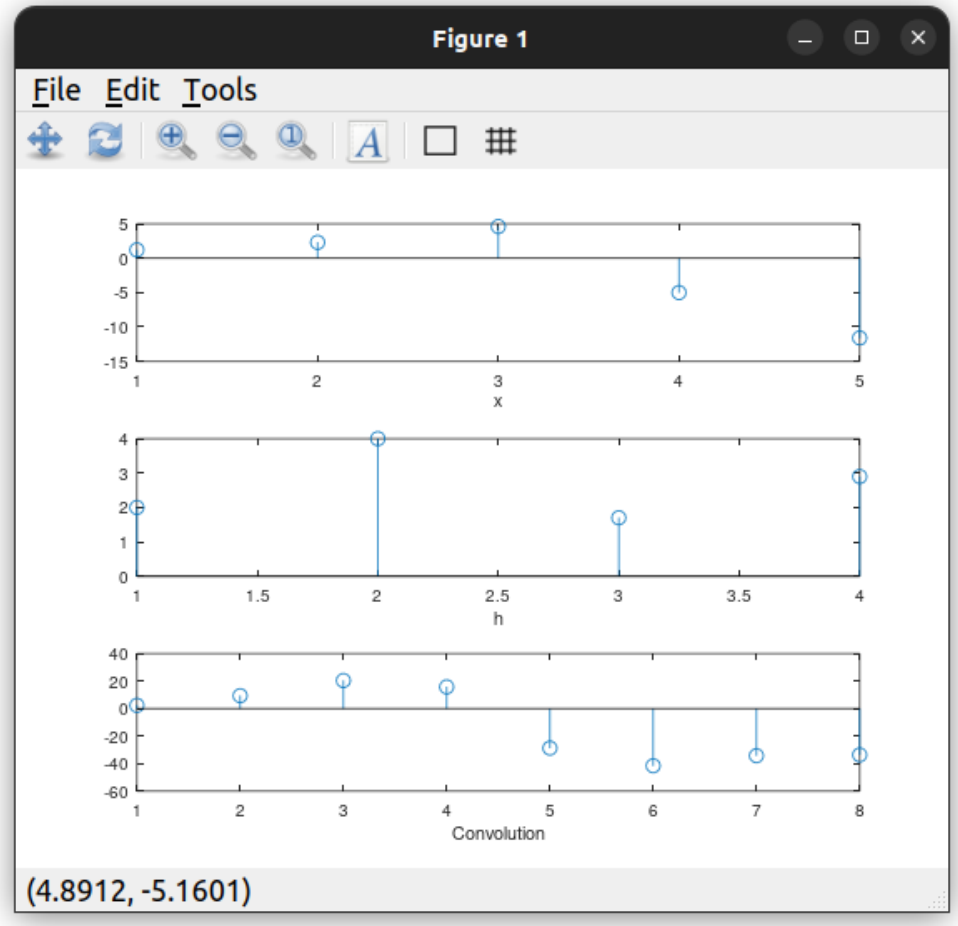


e) x = [1.2 2.3 4.6 -5 -11.6]; h = [2 4 1.7 2.9];

Code :

```
clc;
clear ;

x = [1.2 2.3 4.6 -5 -11.6];
h = [2 4 1.7 2.9];


% convolution
m=length(x);
n=length(h);
X=[x,zeros(1,n)];
H=[h,zeros(1,m)];
for i=1:n+m-1
   y(i)=0;
   for j=1:m
      if(i-j+1>0)
         y(i)=y(i)+X(j)*H(i-j+1);
      else
      end
   end
end
subplot(3,1,1);
stem(x);
xlabel("x");

subplot(3,1,2);
stem(h);
xlabel("h");

subplot(3,1,3);
stem(y);
xlabel("Convolution");
```

Output :

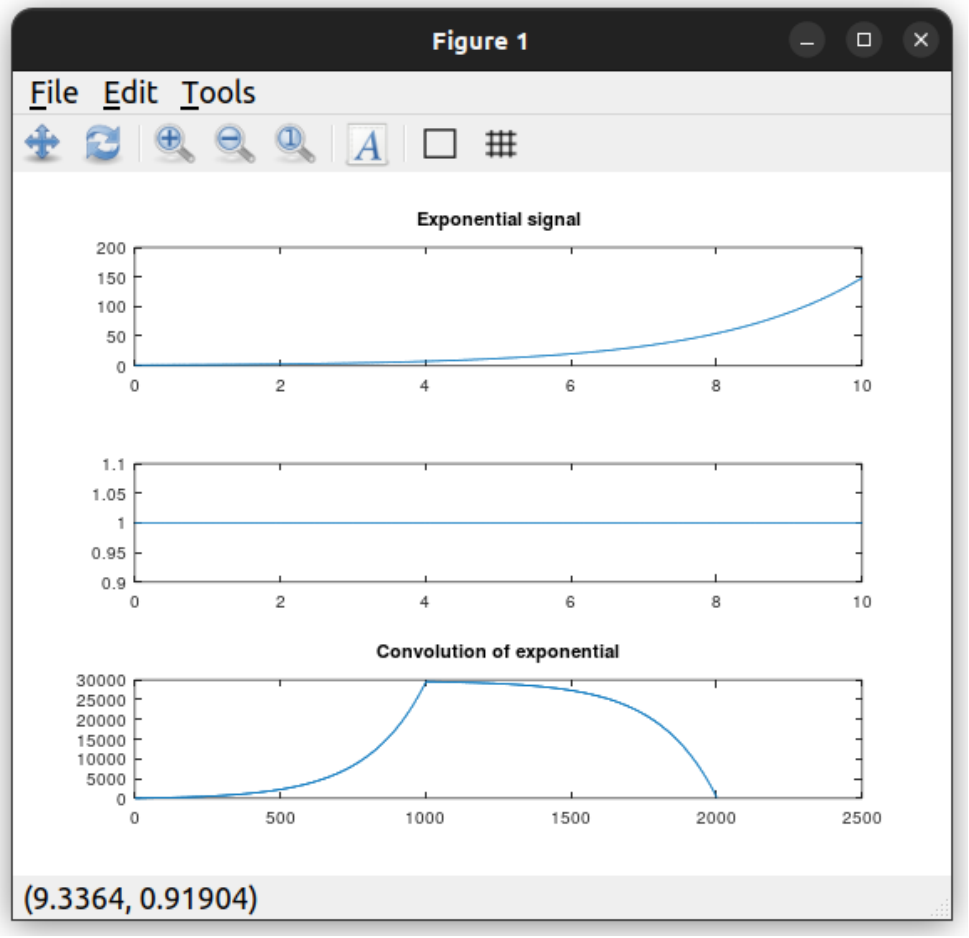


f) Convolution of exponential signal

Code:

```
t= 0:0.01:10;
x = exp(0.5*t);
h = ones(1 , length(x));
y  = conv(h,x);
subplot(311);
plot(t,x);
title('Exponential signal');
subplot(312);
plot(t,h);
title('');
subplot(313);
plot(y);
title('Convolution of exponential');
```

Output:



Conclusion:

Thus in this lab we performed convolution of two signals using inbuilt octave command ‘conv’ . The convolution of both continuous as well as discrete signals were performed and their output after convolution were observed in a plot.