Ahsanullah University of Science and Technology

Lab Report

Course No:- EEE3218

Course Title:- Digital Signal Processing Lab

Report No:- 03

Submitted By,

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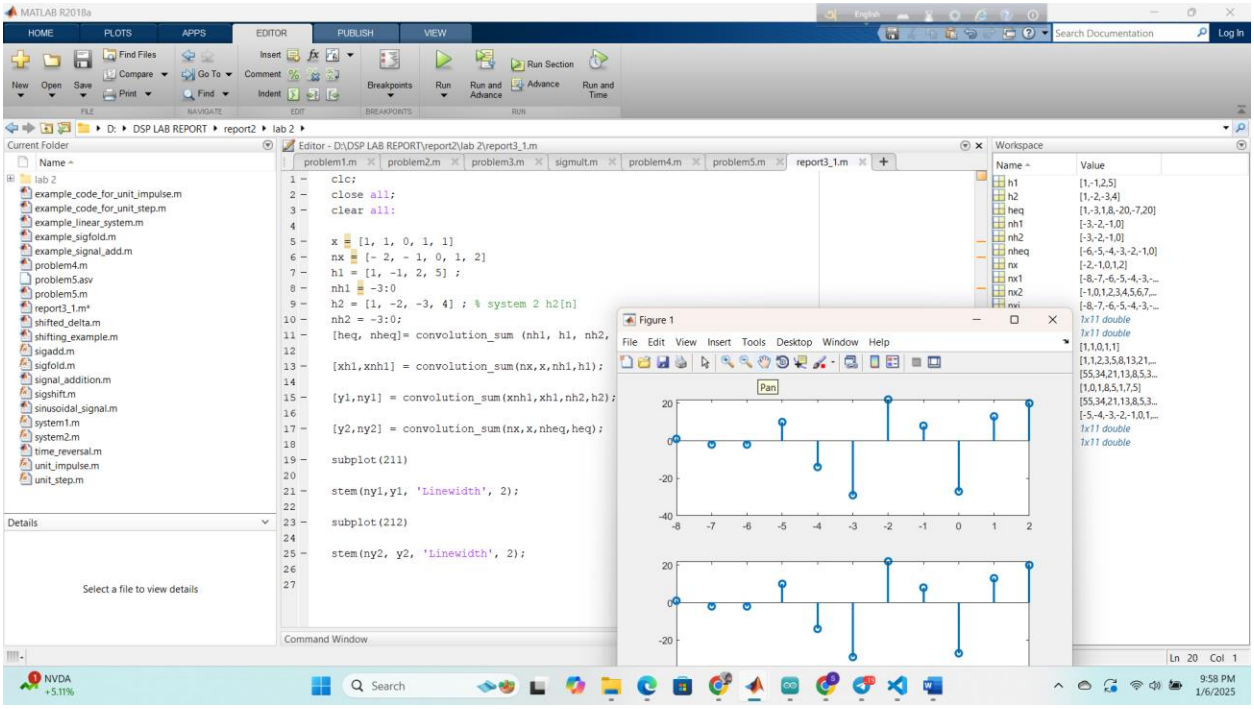
Section:- B2

Year-Semester:- 3/2

Department:- EEE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lab 2
example_code_for_unit_impulse.m
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problem5.asv
problem5.m
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shifting_example.m
sigadd.m
sigfold.m
signal_addition.m
sigshift.m
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system2.m
time_reversal.m
unit_impulse.m
unit_step.m
Details
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Editor - D:\DSP LAB REPORT\report2\lab 2\report3_1.m
problem1.m
problem2.m
problem3.m
sigmult.m
problem4.m
problem5.m
report3_1.m
1 clc;
2 close all;
3 clear all;
4
5 x = [1, 1, 0, 1, 1]
6 nx = [- 2, - 1, 0, 1, 2]
7 h1 = [1, -1, 2, 5] ;
8 nh1 = -3:0
9 h2 = [1, -2, -3, 4] ; % system 2 h2[n]
10 nh2 = -3:0;
11 [heq, nheq]= convolution_sum (nh1, h1, nh2,
12
13 [xh1,xnh1] = convolution_sum(nx,x,nh1,h1);
14
15 [y1,ny1] = convolution_sum(xnh1,xh1,nh2,h2);
16
17 [y2,ny2] = convolution_sum(nx,x,nheq,heq);
18
19 subplot(211)
20
21 stem(ny1,y1, 'Linewidth', 2);
22
23 subplot(212)
24
25 stem(ny2, y2, 'Linewidth', 2);
26
27
Command Window
Workspace
Name
Value
h1 [1,-1,2,5]
h2 [1,-2,-3,4]
heq [1,-3,1,8,-20,-7,20]
nh1 [-3,-2,-1,0]
nh2 [-3,-2,-1,0]
nheq [-6,-5,-4,-3,-2,-1,0]
nx [-2,-1,0,1,2]
nx1 [-8,-7,-6,-5,-4,-3,-...
nx2 [-1,0,1,2,3,4,5,6,7,...
ny2 [-8,-7,-6,-5,-4,-3,-...
1x11 double
1x11 double
[1,1,0,1,1]
[1,1,2,3,5,8,13,21,...
[55,34,21,13,8,5,3...
[1,0,1,8,5,1,7,5]
[55,34,21,13,8,5,3...
[-5,-4,-3,-2,-1,0,1,...
1x11 double
1x11 double
Ln 20 Col 1
Figure 1
File Edit View Insert Tools Desktop Window Help
Pan
20
0
-20
-40
-8 -7 -6 -5 -4 -3 -2 -1 0 1 2
20
0
-20
NVDA
+5.11%
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9:58 PM
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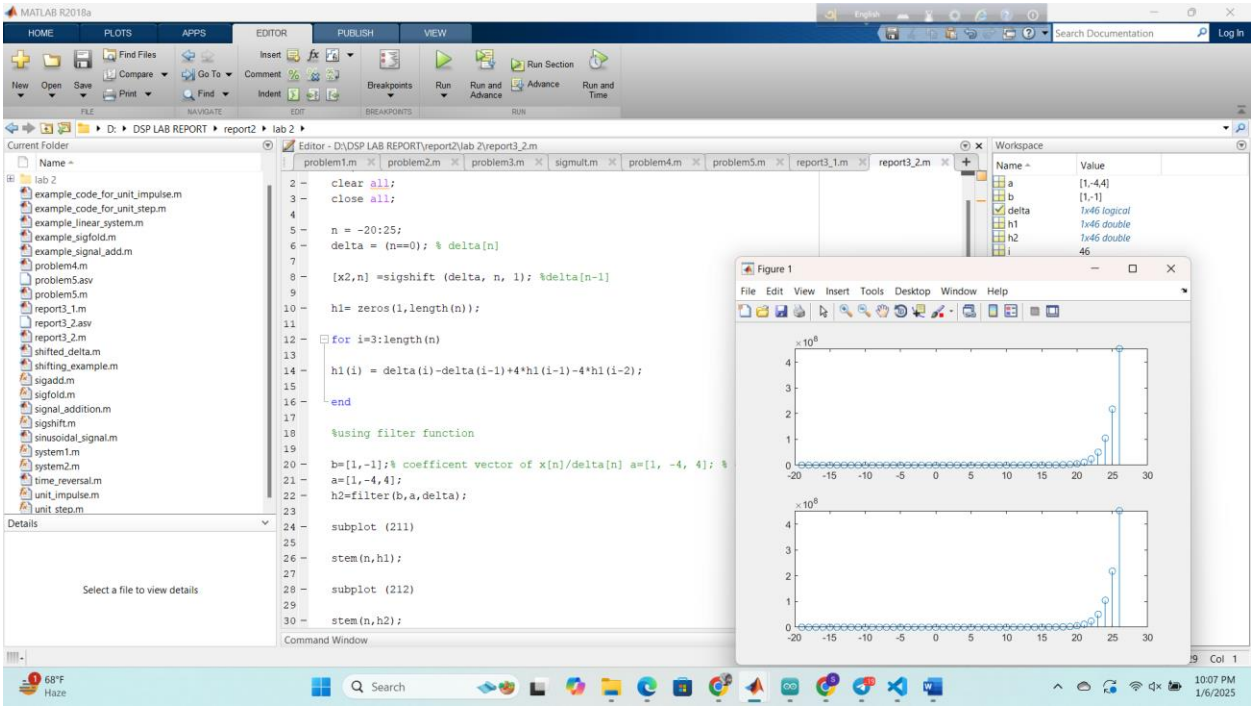
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problem5.asv
problem5.m
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report3_2.m
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shifting_example.m
sigadd.m
sigfold.m
signal_addition.m
sigshift.m
sinusoidal_signal.m
system1.m
system2.m
time_reversal.m
unit_impulse.m
unit_step.m
Details
Select a file to view details
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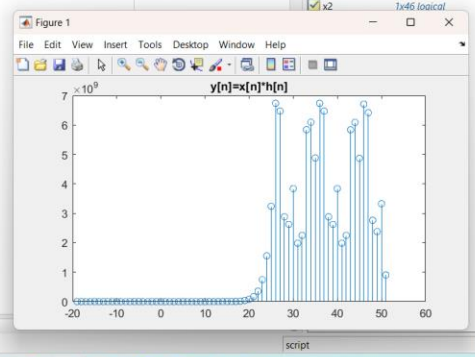
problem1.m
problem2.m
problem3.m
sigmult.m
problem4.m
problem5.m
report3_1.m
report3_2.m
2 clear all;
3 close all;
4
5 n = -20:25;
6 delta = (n==0); % delta[n]
7
8 [x2,n] =sigshift (delta, n, 1); %delta[n-1]
9
10 h1= zeros(1,length(n));
11
12 for i=3:length(n)
13
14 h1(i) = delta(i)-delta(i-1)+4*h1(i-1)-4*h1(i-2);
15
16 end
17
18 %using filter function
19
20 b=[1,-1];% coefficent vector of x[n]/delta[n] a=[1, -4, 4]; %
21 a=[1,-4,4];
22 h2=filter(b,a,delta);
23
24 subplot (211)
25
26 stem(n,h1);
27
28 subplot (212)
29
30 stem(n,h2);
Command Window
Workspace
Name
Value
a [1,-4,4]
b [1,-1]
delta 1x46 logical
h1 1x46 double
h2 1x46 double
i 46
Col 1
Figure 1
File Edit View Insert Tools Desktop Window Help
×10^8
4
3
2
1
0
-20 -15 -10 -5 0 5 10 15 20 25 30
×10^8
4
3
2
1
0
-20 -15 -10 -5 0 5 10 15 20 25 30
68°F
Haze
Search
10:07 PM
1/6/2025

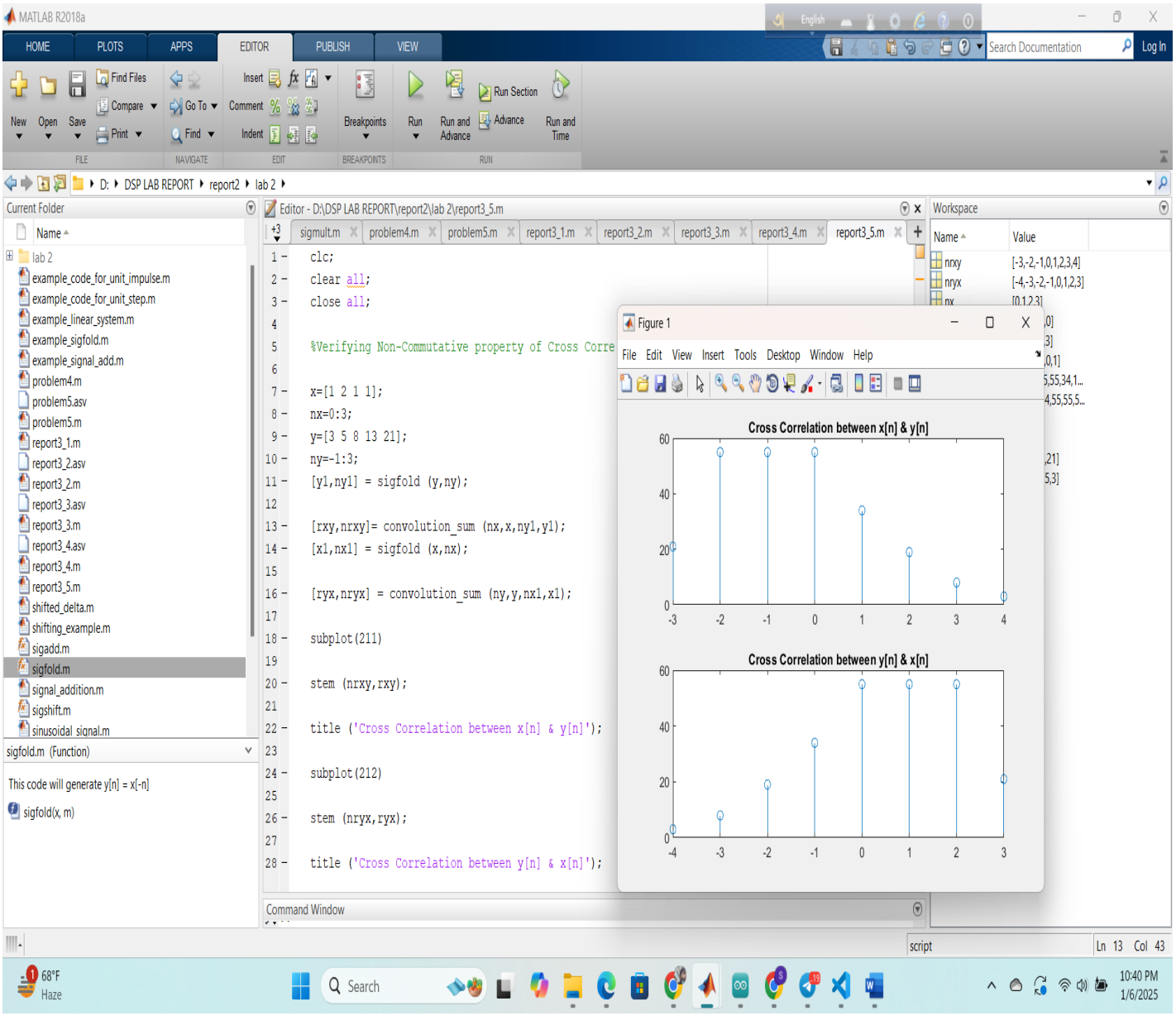
MATLAB R2018a

```
clc;
clear all;
close all;

n=-20:25;
delta = (n==0);
[x2,n] = sigshift (delta, n, 1);
h1= zeros(1,length(n));

for i = 3:length(n)

h1(i) = delta(i)-delta(i-1)+4*h1(i-1)-4*h1(i-2)

end
b=[1,-1]; % coefficent vector of s[n]/delta[n]

a = [1, -4, 4]; % coefficient vector ofy[e]/h[n]

h2 = filter (b,a,delta);

nx=0:25;

x=(5+3*cos (0.2*pi.*nx)+4*sin(0.6*pi.*nx));

[y,ny]= convolution_sum (nx, x, n, h1);

stem(ny,y);
title('y[n]=x[n]*h[n]');
```



MATLAB R2018a

```
clc;
clear all;
close all;
n=0:199;
x=(cos(0.2*pi.*n)+0.5*cos(0.6*pi.*n));

[x2,nx2]=sigshift(0.1*x,n,20);
[y,ny]=sigadd(n,x,nx2,x2);
[y1,ny1]=sigfold(y,ny);

[ryy,nryy]=convolution_sum(ny,y,ny1,y1);

[rxy,nrxy]=convolution_sum(n,x,ny1,y1);

subplot(211)
stem(nryy,ryy);
title('auto correlationy[n]');
subplot(212)
stem(nrxy,rxy);
title('cross correlation');
```


MATLAB R2018a
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problem5.m
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report3_2.m
report3_3.asv
report3_3.m
report3_4.asv
report3_4.m
report3_5.m
shifted_delta.m
shifting_example.m
sigadd.m
sigfold.m
signal_addition.m
sigshift.m
sinusoidal_signal.m
sigfold.m (Function)
This code will generate y[n] = x[-n]
sigfold(x, m)
Editor - D:\DSP LAB REPORT\report2\lab 2\report3_5.m
sigmult.m
problem4.m
problem5.m
report3_1.m
report3_2.m
report3_3.m
report3_4.m
report3_5.m
1 clc;
2 clear all;
3 close all;
4
5 %Verifying Non-Commutative property of Cross Corre
6
7 x=[1 2 1 1];
8 nx=0:3;
9 y=[3 5 8 13 21];
10 ny=-1:3;
11 [y1,ny1] = sigfold (y,ny);
12
13 [rxy,nrxy]= convolution_sum (nx,x,ny1,y1);
14 [x1,nx1] = sigfold (x,nx);
15
16 [ryx,nryx] = convolution_sum (ny,y,nx1,x1);
17
18 subplot(211)
19
20 stem (nrxy,rxy);
21
22 title ('Cross Correlation between x[n] & y[n]');
23
24 subplot(212)
25
26 stem (nryx,ryx);
27
28 title ('Cross Correlation between y[n] & x[n]');
Workspace
Name
Value
nrxy
[-3,-2,-1,0,1,2,3,4]
nryx
[-4,-3,-2,-1,0,1,2,3]
Figure 1
File Edit View Insert Tools Desktop Window Help
Cross Correlation between x[n] & y[n]
Cross Correlation between y[n] & x[n]
Command Window
script
Ln 13 Col 43
68°F
Haze
Search
10:40 PM
1/6/2025