EE562 - Digital Signal Processing I

Second Semester (212)

Computer Assignment 3

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```matlab
%Assignment 3
% Done by Mahmoud Yassin Mahmoud
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% Submitted To Dr. Wail A. Mousa
% Bism Allah and I will start with
%(Q1):
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
clc;
clear;
%------------------------------------------------------------
%defining time
n1 = -3:-1;% defining -ve range
n2 = 0:15;% defining +ve range
n =[n1 n2]; % combined range
N2 = length(n2);% length of positive range
N = length(n);
%------------------------------------------------------------
a = [1 -0.8];% the coefficients a[k] of the output signal y(n)
b = [5];% the coefficients b[k] of the input signal x(n)
x = [zeros(1,length(n1)) 2 -3 0 2 zeros(1,N2-4)]; % the x(n) is zero padded to define it for -3=<n=<15
y = filter(b,a,x);
%------------------------------------------------------------
% Plotting
subplot(221)
  stem(n,x);
  legend('x[n]')
     grid minor
     title('x(n) = 2\delta(n)-3\delta(n-1)+2\delta(n-3)')
     xlabel('-3< n < 15')
     ylabel('x(n)')
subplot(222)
  stem(n,y);
  legend('y(n)')
     grid minor
     title(['y(n) = 0.8y(n-1)+5x(n)'])
     xlabel('-3< n < 15')
     ylabel('y(n)')
%------------------------------------------------------------
% creating table
n= n.';
x= x.';
y= y.';
Results = table(n,x,y)
```

Results =

  19×3 table

    n   x   y
    __   __   _____

    -3   0   0
    -2   0   0
    -1   0   0
     0   2   10
     1   -3   -7
     2   0   -5.6

3	2	5.52
4	0	4.416
5	0	3.5328
6	0	2.8262
7	0	2.261
8	0	1.8088
9	0	1.447
10	0	1.1576
11	0	0.9261
12	0	0.74088
13	0	0.59271
14	0	0.47416
15	0	0.37933

$x(n) = 2\delta(n)-3\delta(n-1)+2\delta(n-3)$

-3< n < 15

$y(n) = 0.8y(n-1)+5x(n)$

-3< n < 15