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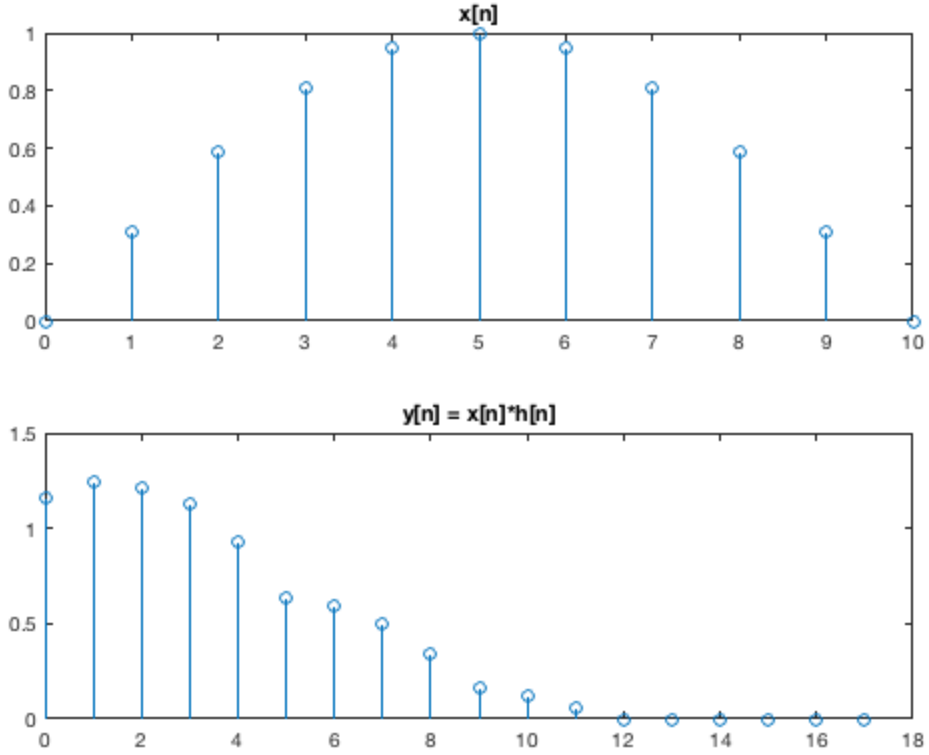
Task 1: x[n] = sin(pi*n/10)(u[n]-u[n-10]), h[n] = del[n]+0.5del[n-4] + 0.2del[n-7]

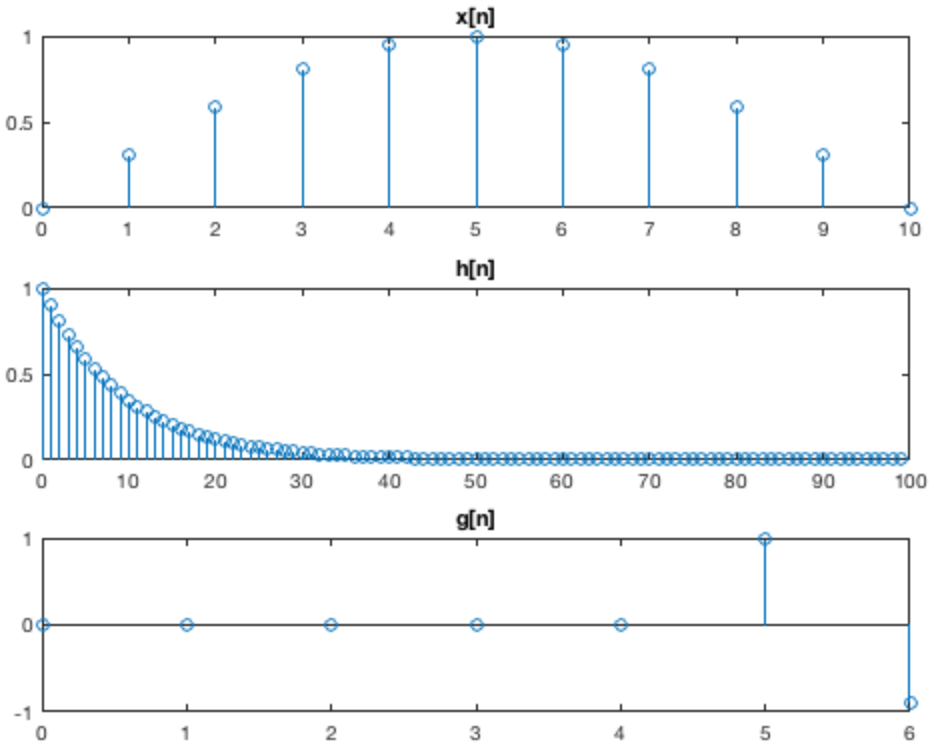
```
clear all
close all
n = 0:10;
x = sin(pi*n/10);
h = [1, 0, 0, 0,  0.5, 0, 0, 0.2, zeros(1,10)];
y = conv(h,x,'same');
figure
subplot(2,1,1)
stem(n,x)
title('x[n]')
subplot(2,1,2)
stem(0:length(y)-1,y)
title('y[n] = x[n]*h[n]')
```

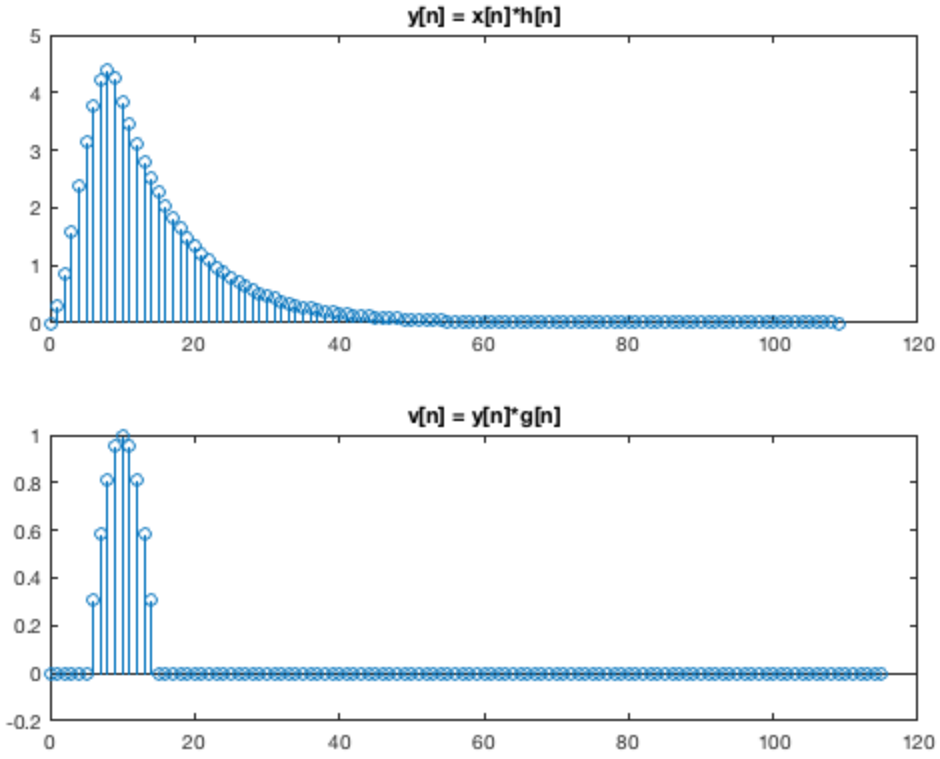


Task 2: x[n] = sin(pi*n/10)(u[n]-u[n-10]), h[n] = 0.9^n*u[n], g[n]= del[n-5] - 0.9del[n-6]

```
clear all
n = 0:10;
x = sin(pi*n/10);
n1 = 0:99;
h = 0.9 .^ n1;
g = [0, 0, 0, 0,  0, 1, -0.9];
y = conv(h,x);
v = conv(y,g);
%plots
figure
subplot(3,1,1)
stem(n,x)
title('x[n]')
subplot(3,1,2)
stem(n1,h)
title('h[n]')
subplot(3,1,3)
stem(0:length(g)-1,g)
title('g[n]')
figure
subplot(2,1,1)
```

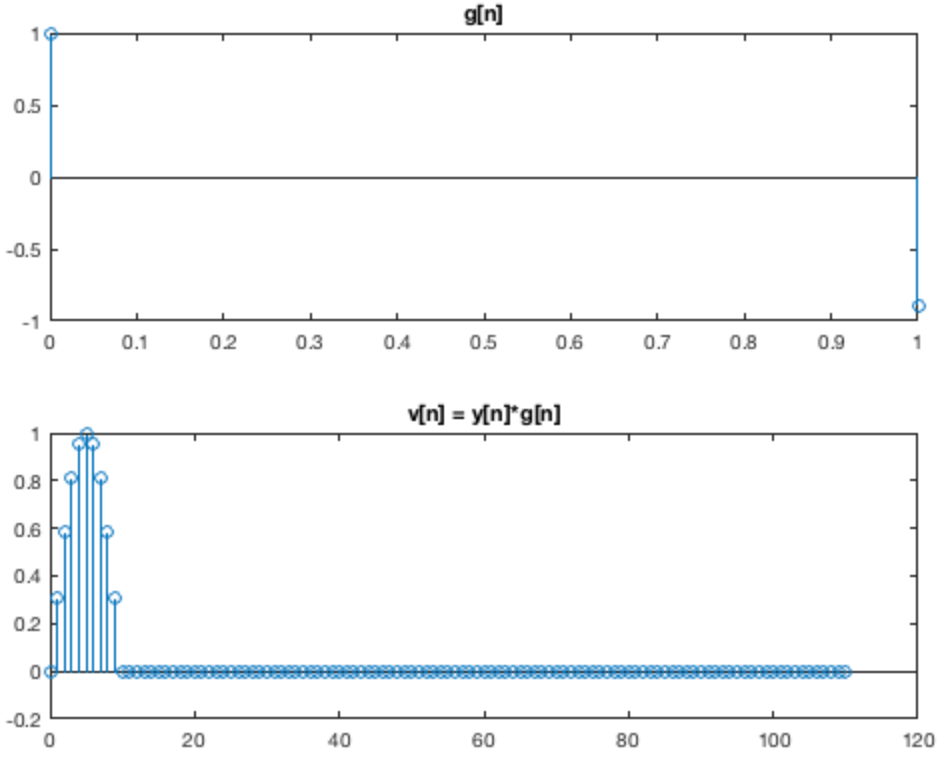
```
stem(0:length(y)-1,y)
title('y[n] = x[n]*h[n]')
subplot(2,1,2)
stem(0:length(v)-1,v)
title('v[n] = y[n]*g[n]')
```





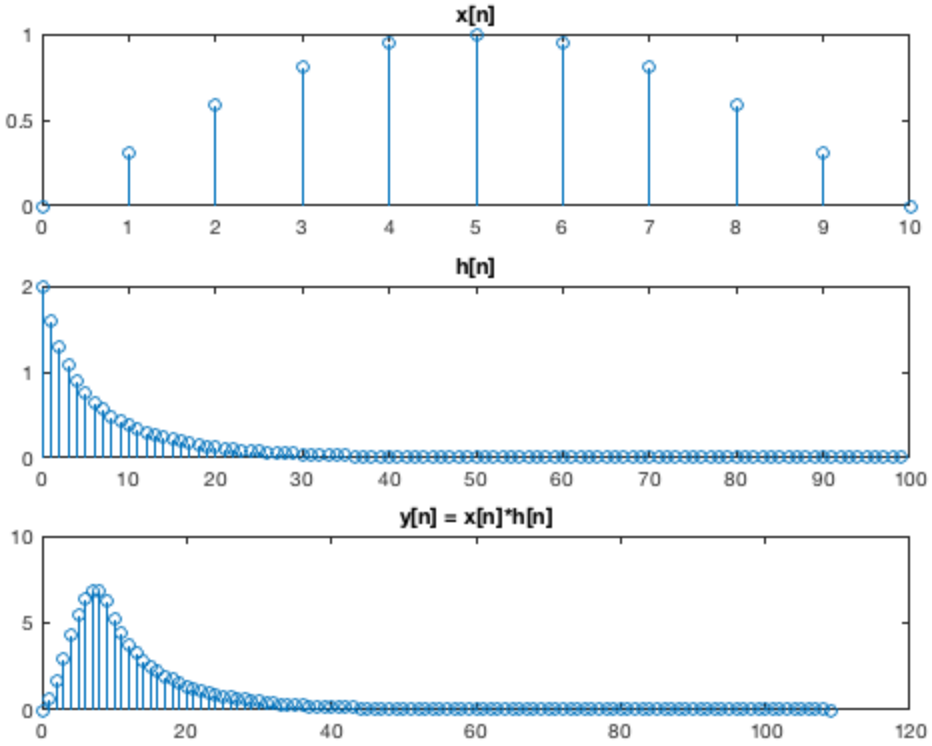
task2 continued, finding perfect echo cancellation

```
g =[1, -0.9];
v = conv(y,g);
%plots
figure
subplot(2,1,1)
stem(0:length(g)-1,g)
title('g[n]')
subplot(2,1,2)
stem(0:length(v)-1,v)
title('v[n] = y[n]*g[n]')
```



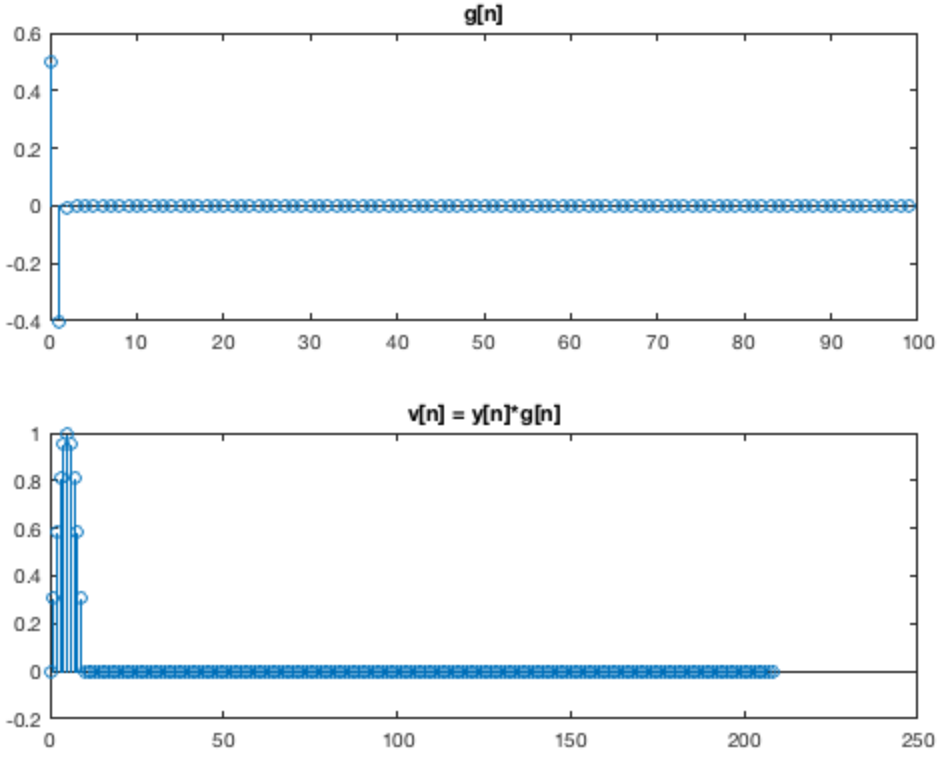
Task 3:

```
clear all
n = 0:10;
x = sin(pi*n/10);
n1 = 0:99;
h = 0.9 .^ n1 + 0.7 .^n1;
y = conv(h,x);
%plots
figure
subplot(3,1,1)
stem(n,x)
title('x[n]')
subplot(3,1,2)
stem(n1,h)
title('h[n]')
subplot(3,1,3)
stem(0:length(y)-1,y)
title('y[n] = x[n]*h[n]')
```



task3 continued, finding perfect echo cancellation

```
n1 = 0:99;
g1 = 0.5*0.8.^n1;
g2 = [0, -0.8*0.8.^n1];
g3 =[0,0, 0.63/2*0.8.^n1];
g = g1+g2(1:end-1)+g3(1:end-2);
v = conv(y,g);
%plots
figure
subplot(2,1,1)
stem(0:length(g)-1,g)
title('g[n]')
subplot(2,1,2)
stem(0:length(v)-1,v)
title('v[n] = y[n]*g[n]')
```



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