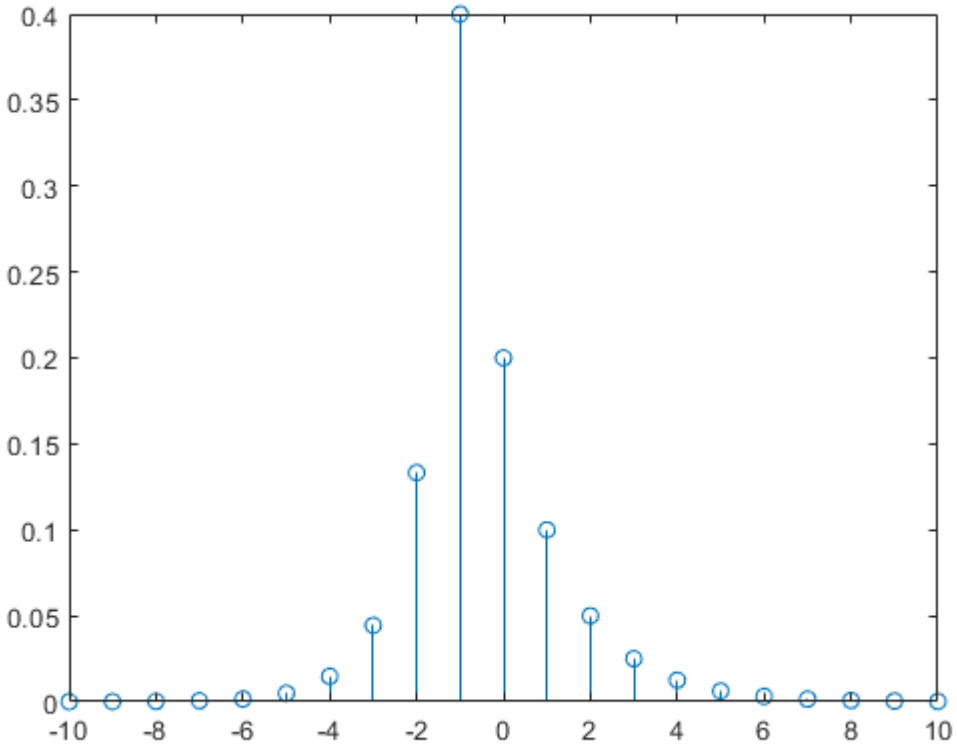
Contents

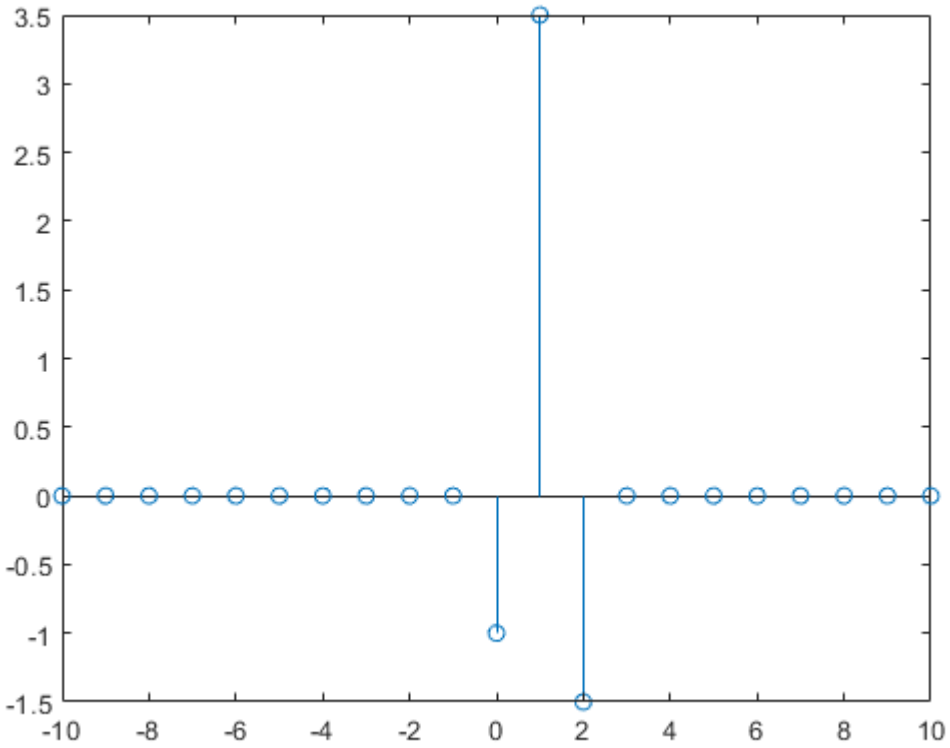
Part 1

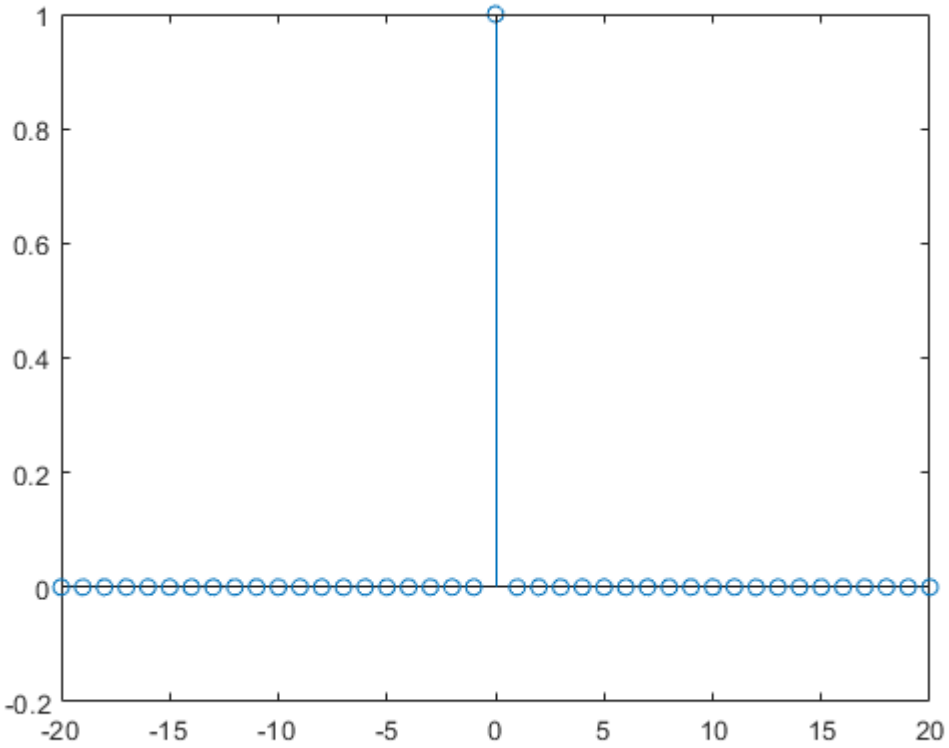
(a) H1(z)= 1/(1+0.5z^-1); ROC: Z>0.5 H2(z)= 1/(3z^-1-1); ROC: Z<3 H(z) = H1(z)*H2(z)= [1/(1+0.5z^-1)]*[1/(3z^-1-1)]

```
%(b)

% H(z) = 1/(5*(1+0.5z^-1))+6/(5(1/(3z^-1-1))

% h(n) = 1/5*(0.5)^n*u(n) + 6/5*3^n*u(-n-1)

n = -10:10;

for i=1:length(n)

    if n(i)<0

        h(i)=(6/5)*3^n(i);

    else

        h(i)=(1/5)*(0.5)^n(i);

    end

end



figure()

stem(n,h);



%(c)

% G(z) = 1/H(z) = -1 + 3.5z^-1 - 1.5z^-2
```

```
g = zeros(1,length(n));
for i=1:length(n)
    if n(i)==0
        g(i)=-1;
    end
    if n(i)==1
        g(i)=3.5;
    end
    if n(i)==2
        g(i)=-1.5;
    end
end

figure()
stem(n,g);

m = n(1)*2:n(length(n))*2;
y = conv(h,g);
figure()
stem(m,y);
```


0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-10
-8
-6
-4
-2
0
2
4
6
8
10

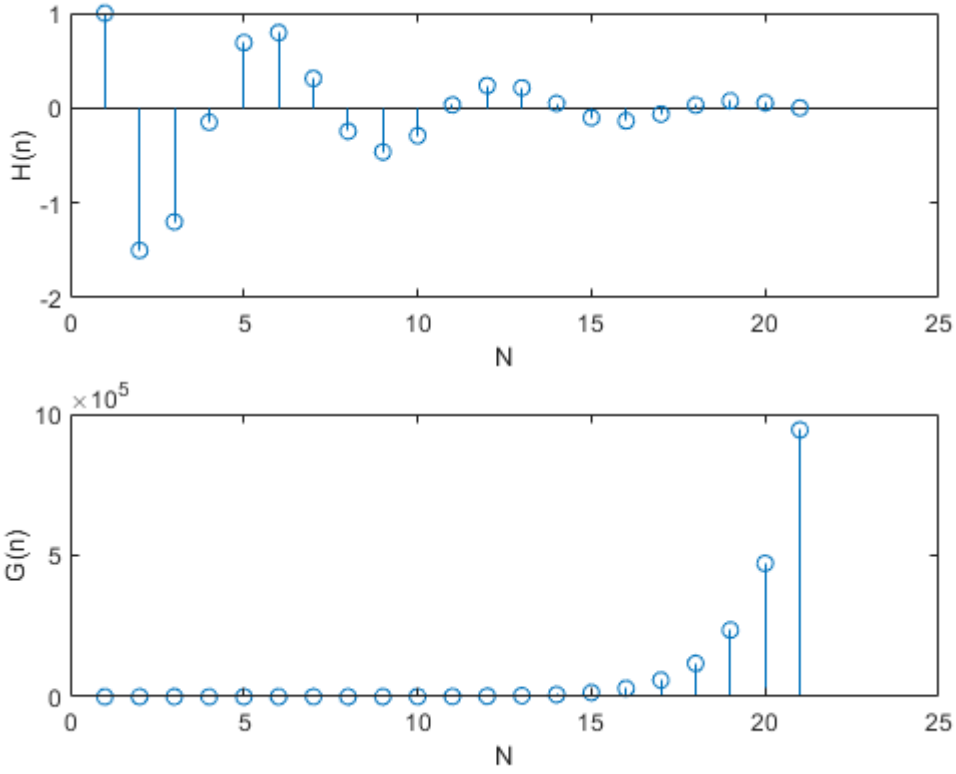

3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-10
-8
-6
-4
-2
0
2
4
6
8
10



Part 2

```
%(a)

%g(n) = 1/H(z)



[r,p,k] = residue(b,a);



n = 0:20;

x = zeros(size(n));

y = zeros(size(n));




% simulating the impulse response
```

```
b = [1 -2.5 1];

a = [1 -1 0.7];

h = filter(b,a,[1,zeros(1,20)]);



a1 = [1 -2.5 1];

b1 = [1 -1 0.7];

h1 = filter(b1,a1,[1,zeros(1,20)]);

% plotting

subplot(2,1,1);



stem(h);

xlabel('N');

ylabel('H(n)');

subplot(2,1,2);

stem(h1);

xlabel('N');

ylabel('G(n)');
```



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