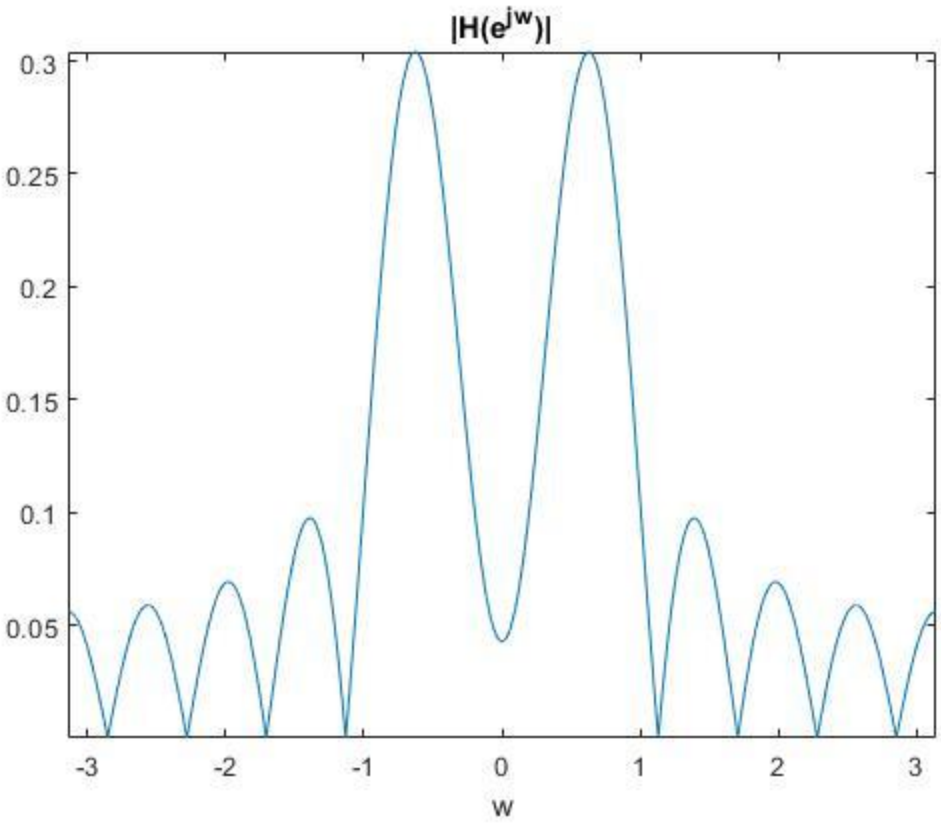
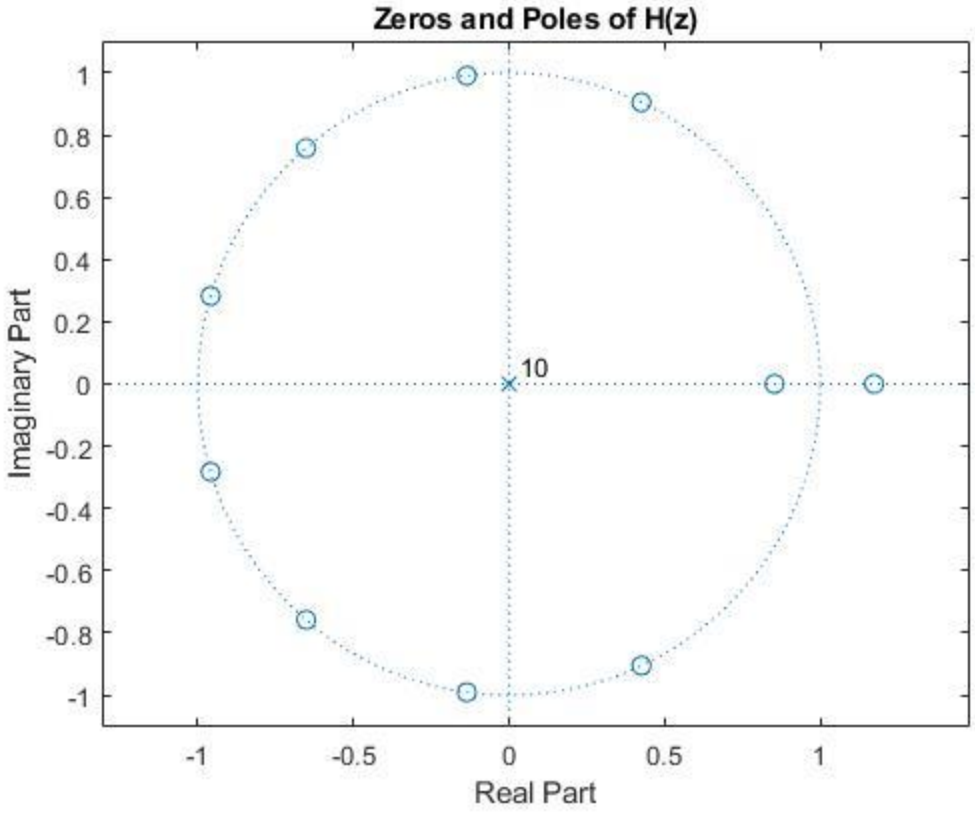
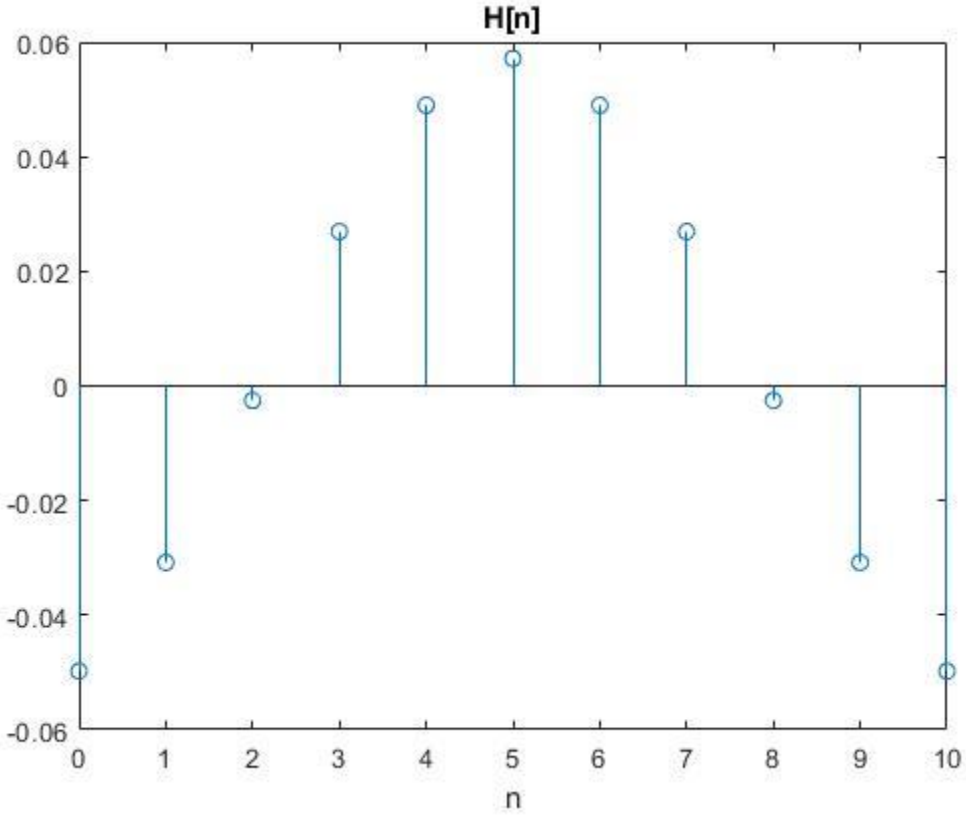
```
%% Q1
n = 0:10;
h_n = (1./(pi.*(n-5))).*(sin(pi.*(n-5)./5)-sin(pi.*(n-5)./7));
h_n(6) = 2/35;
disp(h_n);
figure();
stem(n,h_n);
title('h[n]');
xlabel('n');

figure();
zplane(h_n);
title('Zeros and Poles of H(z)');

w = -pi:0.001:pi;
H_abs = abs(sum(h_n.'.*exp(n.'.*(-1j).*w)));
figure();
plot(w,H_abs);
axis tight
title('|H(e^j^w)|');
xlabel('w');

%% Q2
alpha = 50;
ts_param = 512;
rng = 1023;
limit = 1023;
n = 0:rng;
xf_n = chirp(limit, alpha, ts_param, rng);
figure();
plot(n,xf_n);
title('xf[n]');
xlabel('n');

%% Q3
alpha = 1000;
ts_param = 8192;
rng = 8191;
limit = 9000;
n = 0:rng;
xg_n = chirp(limit, alpha, ts_param, rng);
figure();
plot(n,xg_n);
title('xg[n]');
xlabel('x');

%% Q4
% h_n
n = 0:10;
```

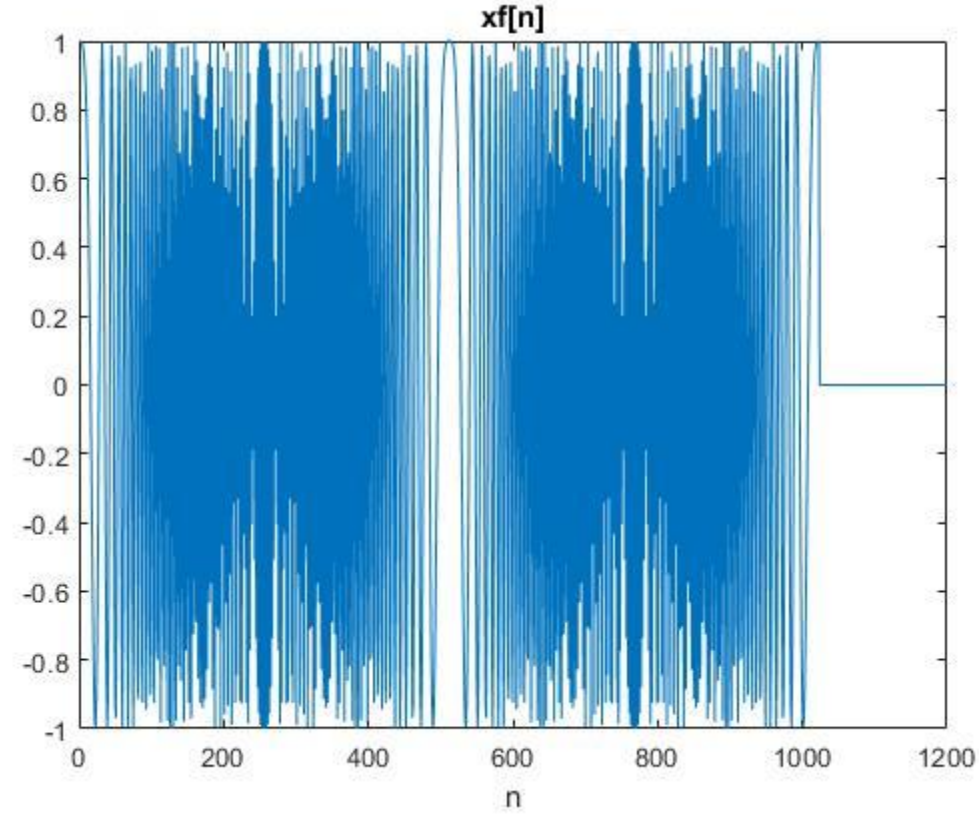
```
h_n = (1./(pi.*(n-5))).*(sin(pi.*(n-5)./5)-sin(pi.*(n-5)./7));
h_n(6) = 2/35;
y1_n = conv(xf_n, h_n);
figure();
plot(0:length(y1_n)-1,y1_n);
title('y1[n]');
xlabel('n');
axis tight

y2_n = conv(xg_n, h_n);
figure();
plot(0:length(y2_n)-1,y2_n);
title('y2[n]');
xlabel('n');
axis tight
%% save
save('y1_n');


%% Functions
 function out = speaker(data, alpha, param)
     sample_time = sqrt(pi./(param.*alpha));
     sample_freq = 1./sample_time;
     sound(data, sample_freq);
 end

function out = chirp(limit, alpha, param, rng)
sample_time = sqrt(pi./(param.*alpha));
out = zeros(1,rng+1);
for i = 1:rng+1
    if(0 <= i-1 && i-1 <= limit)
        out(i) = cos(alpha.*((i-1).*sample_time).^2);
    else
        out(i) = 0.*(i-1);
    end
end
end


----------------------------------------Program 2--------------------

%% load
data = load('y1_n');
%% Q5
alpha = 1000;
param = 8192;
sample_time = sqrt(pi./(param.*alpha));
sample_freq = 1./sample_time;
player = audioplayer(xg_n, sample_freq);
```

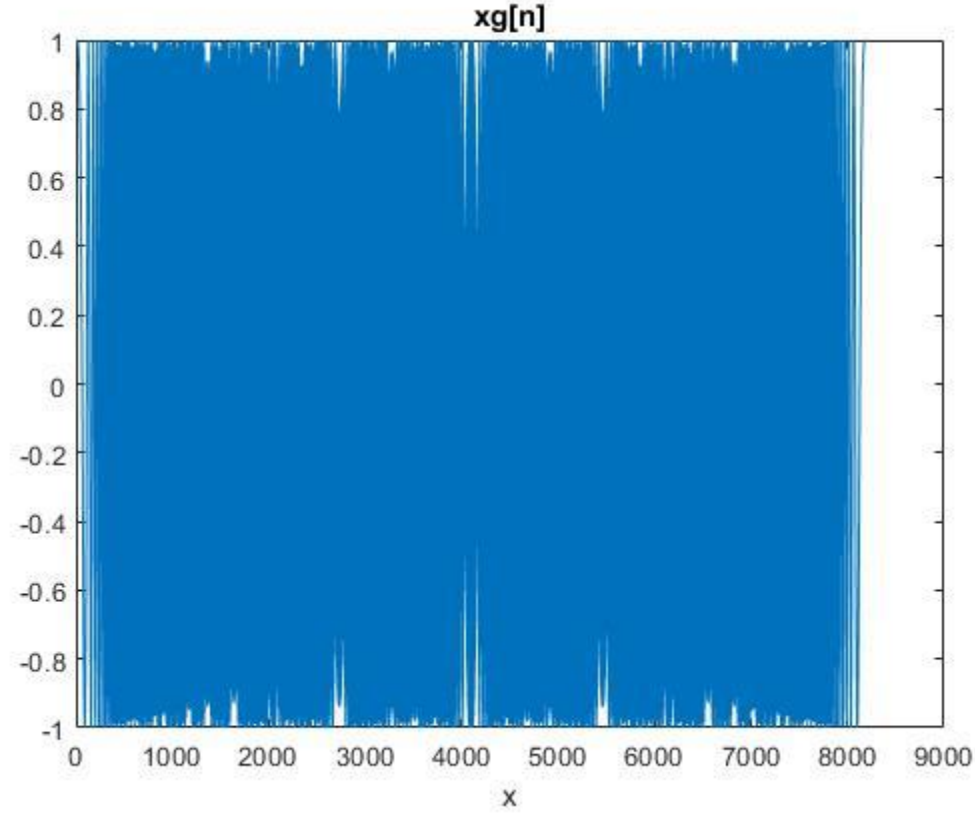
```
period = sample_time.*length(xg_n);
 while(1)
     play(player);
     pause(period-0.1);
     stop(player);
 end
%% Q6
alpha = 1000;
param = 8192;
sample_time = sqrt(pi./(param.*alpha));
sample_freq = 1./sample_time;
player = audioplayer(y2_n, sample_freq);
getaudiodata()
period =  sample_time.*length(y2_n);
 while(1)
     play(player);
     pause(period-0.1);
     stop(player);
 end

 %% Q8
 [music frq] = audioread('AJudas.mp3');
 cropped = music(1:1000000,[1,2]);
 sound(cropped,frq);

%% Q8B
 cropped_tr = cropped';
 filtr_msc_1 = conv(cropped_tr(1,1:end),h_n);
 filtr_msc_2 = conv(cropped_tr(2,1:end),h_n);
 filtr_msc = [filtr_msc_1; filtr_msc_2];
 sound(filtr_msc,frq);

 %% Q9
 [record frq_2] = audioread('Kay?t.m4a');
 cropped = record(1:end,[1,2]);
 sound(cropped,frq_2);

%% Q9B
 cropped_tr = cropped';
 filtr_msc_1 = conv(cropped_tr(1,1:end),h_n);
 filtr_msc_2 = conv(cropped_tr(2,1:end),h_n);
 filtr_msc = [filtr_msc_1; filtr_msc_2];
 sound(filtr_msc,frq);
```

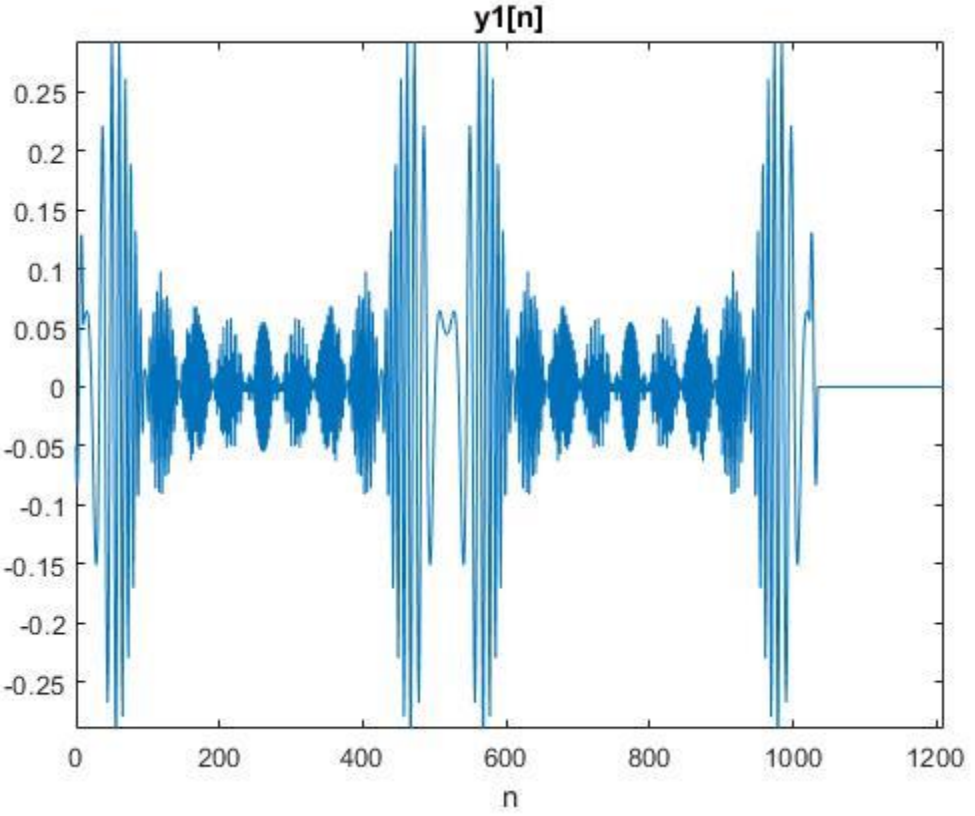

|H(e^jw)|
0.3
0.25
0.2
0.15
0.1
0.05
-3
-2
-1
0
1
2
3
w

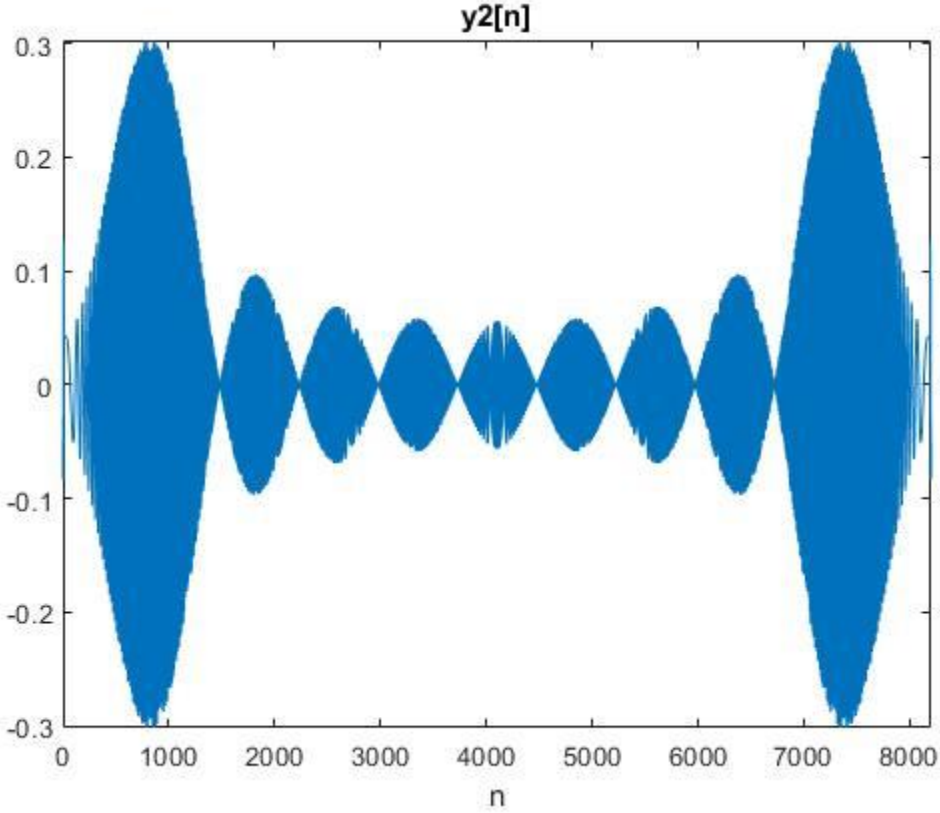

Zeros and Poles of H(z)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
10
Imaginary Part
-1
-0.5
0
0.5
1
Real Part


H[n]
0.06
0.04
0.02
0
-0.02
-0.04
-0.06
0
1
2
3
4
5
6
7
8
9
10
n


xf[n]
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
200
400
600
800
1000
1200
n


xg[n]
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
x


y1[n]
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
0
200
400
600
800
1000
1200
n


y2[n]
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
0
1000
2000
3000
4000
5000
6000
7000
8000
n