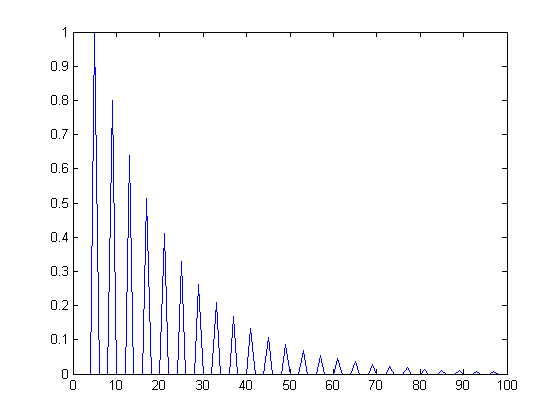
**20a)**



x = zeros(100);

x(1) = 1;

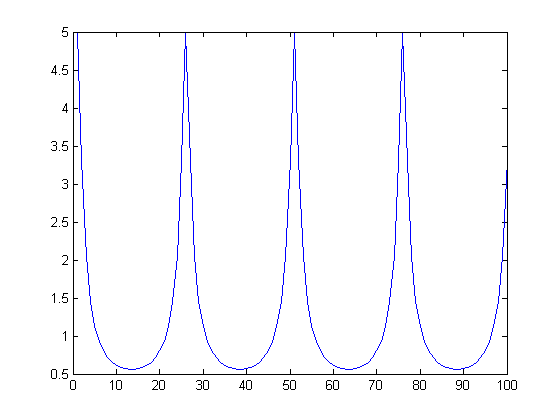
num = [0,0,0,0,1];

den = [1,0,0,0,-.8];

h=filter(num,den,x);

plot(h,'DisplayName','h','YDataSource','h');figure(gcf)

b)

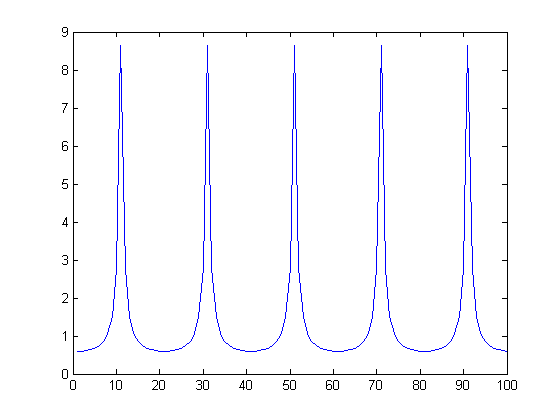


hfft = fft(h);

hm = abs(hfft);

plot(hm,'DisplayName','hm','YDataSource','hm');figure(gcf)

c)



num=zeros(1,6)

num(6)=1;

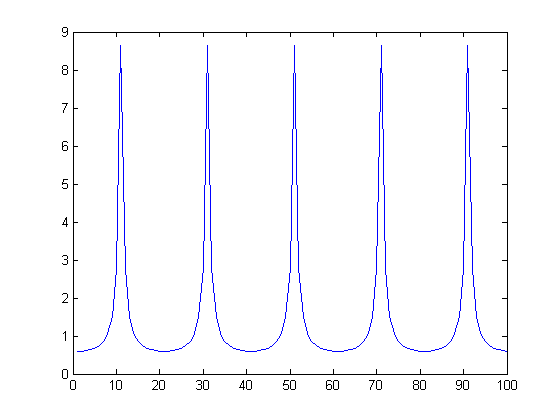
>> den=zeros(1,6);

>> den(1)=1;

>> den(6)=.9;

h=filter(num,den,x);

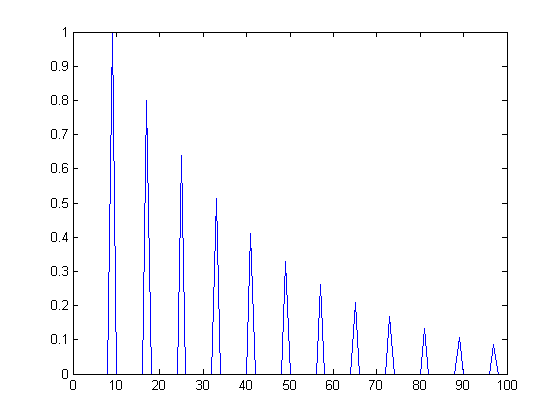
>> plot(h,'DisplayName','h','YDataSource','h');figure(gcf)



>> hfft=fft(h);

>> hm=abs(hfft);

>> plot(hm,'DisplayName','hm','YDataSource','hm');figure(gcf)



>> num=zeros(1,9);

>> num(9)=1;

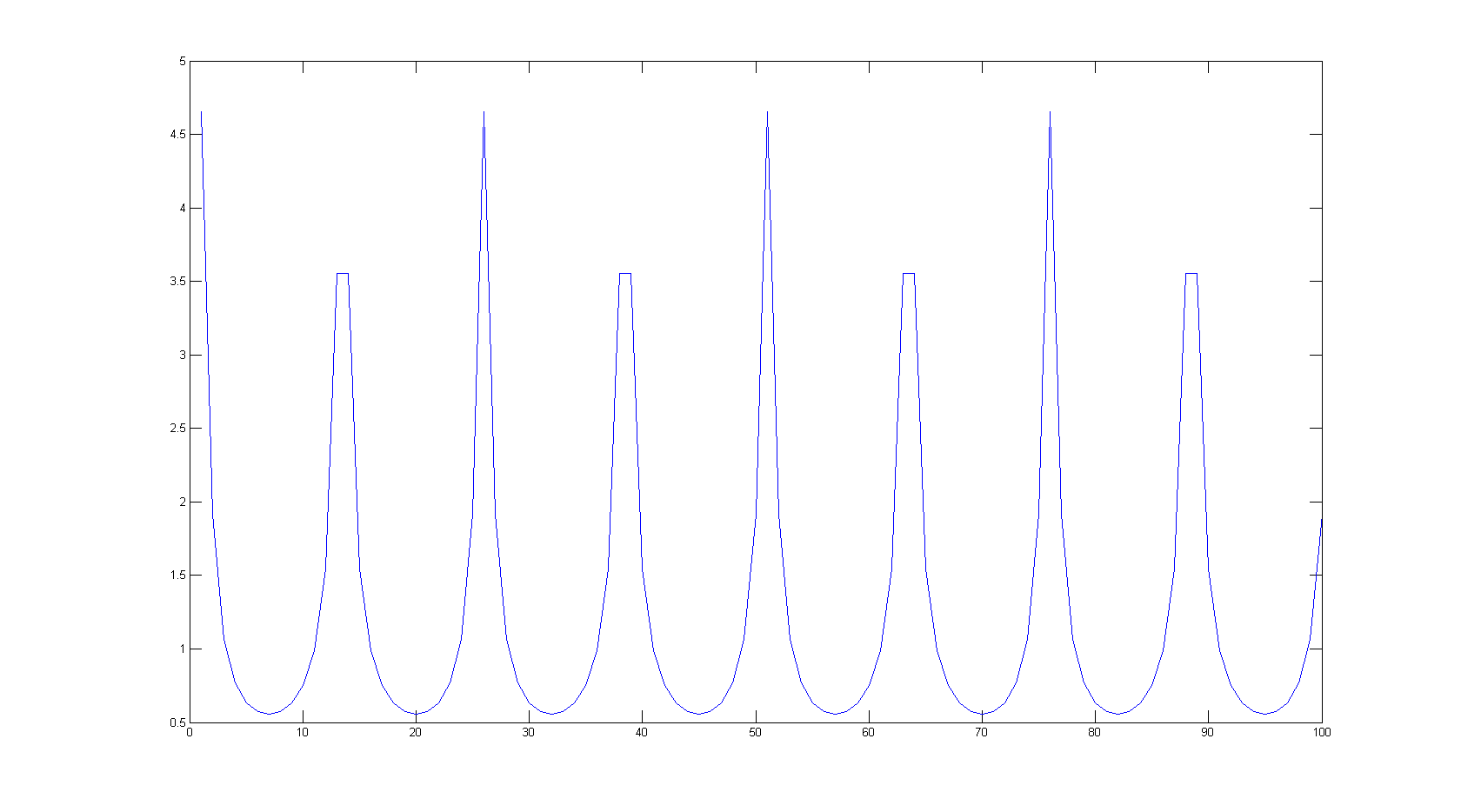
>> den=zeros(1,9);

>> den(1)=1;

>> den(9)=-.8;

>> h=filter(num,den,x);

>> plot(h,'DisplayName','h','YDataSource','h');figure(gcf)

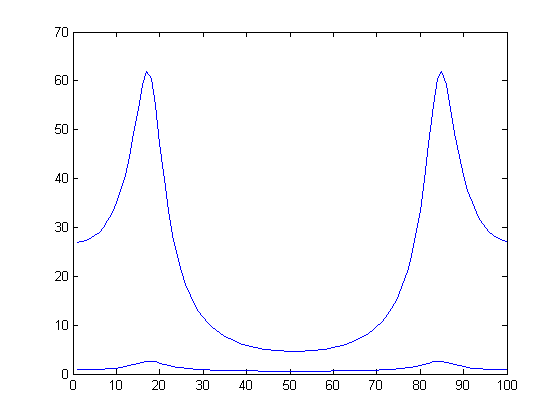


>> hfft=fft(h);

>> hm=abs(hfft);

>> plot(hm,'DisplayName','hm','YDataSource','hm');figure(gcf)

**42)**



H(Z)mp and H(Z)nmp are a scalar off from each other.

>> c=[1,5.6569,16];

>> roots(c);

>> a = roots(c);

>> a1=1/a(1);

>> a2=1/a(2);

>> num = [1,a2+a1,a1\*a2];

>> den = [1,-.8,.64];

>> hnmp = filter(c,den,x);

>> hmp = filter(num,den,x);

>> fftnmp = fft(hnmp);

>> fftmp = fft(hmp);

>> mnmp = abs(fftnmp);

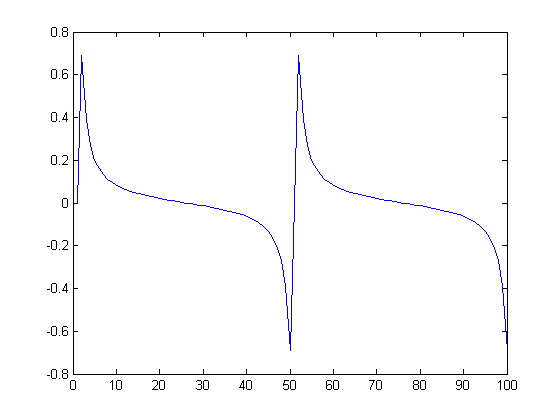
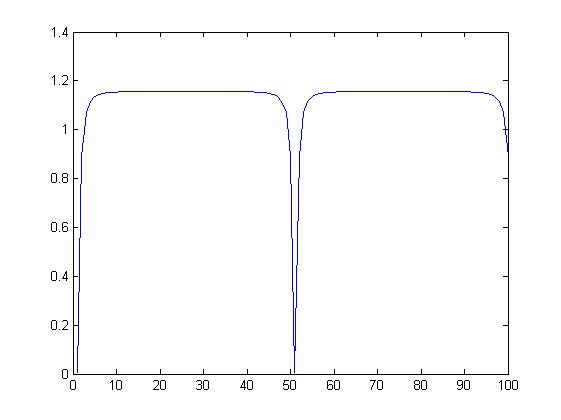
>> mmp = abs(fftmp);

>> plot(mmp,'DisplayName','mmp','YDataSource','mmp');figure(gcf)

>> hold

>> plot(mnmp,'DisplayName','mnmp','YDataSource','mnmp');figure(gcf)

**45)**



>> num = [1.1,0,-1.1];

>> den = [1,0,-.9];

>> h=filter(num,den,x);

>> hfft=fft(h);

>> mfft= abs(hfft);

>> pfft=angle(hfft);

>> plot(pfft,'DisplayName','pfft','YDataSource','pfft');figure(gcf)

>> plot(mfft,'DisplayName','mfft','YDataSource','mfft');figure(gcf)

**c)**

function [ y ] = plotfunc( x )

num = [1.1,0,-1.1];

den = [1,0,-.9];

y = filter(num,den,x);

d = zeros(1,8);

d(1) = 1;

h = filter(num,den,x);

Htf = fft(h);

Hm = abs(Htf);

w = 0:pi/8:pi;

subplot(1,2,1);

plot(x);

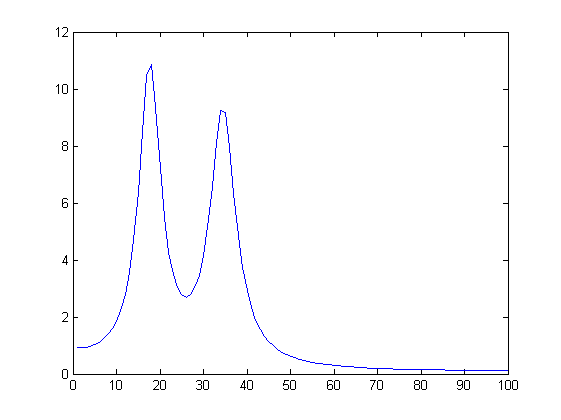
hold on;

plot(y);

hold off

subplot(1,2,2);

plot(Hm);



>> num = [1,-2.73,3.73,-2.73,1];

>> den = [1,-2.46,3.02,-1.99,0.66];

>> Gd = grpdelay(num,den,100);

>> plot(Gd,'DisplayName','Gd','YDataSource','Gd');figure(gcf)