ขั้นบรรได

clear all;

clc;

%?????????

N=200;

alpha=(N/2)-1;

upper\_limit=(N/2)-1;

Fs=20000;

H=[0 0 0 3.1622 3.1622 3.1622 3.1622 3.1622 3.1622 3.1622 3.1622 5.6234 5.6234 5.6234 5.6234 5.6234 17.7828 17.7828 17.7828 17.7828 17.7828 56.2341 56.2341 56.2341 56.2341 56.2341 56.2341 56.2341 56.2341 56.2341 56.2341 100 100 100 100 100 100 100 100 100 100 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 177.8279 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 316.2278 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0];

m=1;

for n=0:(N-1);

for k=1:upper\_limit

inner(k)=2\*abs(H(k+1))\*cos(abs(2\*pi\*k\*(n-alpha)/N));

end

tot\_inner=sum(inner)+H(0+1);

h(m)=(1/N)\*tot\_inner;

m=m+1;

end

[H,q]=freqz(h,1,512,Fs);

amp\_resp=abs(H);

phase\_resp=angle(H);

figure(1);plot(q,amp\_resp);

title('amplitude response of nonrecursive frequency sampling FIR filter');

xlabel('Frequency in Hz');ylabel(' Amplitude');axis([0 Fs/2 0 400]); grid;

%sine 250 Hz

f1=250;

fs=10000;

N=0:5000;

t=N/fs;

x1=sin(2\*pi\*f1\*t)

X1=fft(x1);

L=length(N);

Mag\_X1=abs(X1(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(2);plot(f\_scale,Mag\_X1); xlabel('Frequency in Hz');

ylabel('Amplitude');

y1=filter(h,1,x1)

Y1=fft(y1);

L=length(N);

Mag\_Y1=abs(Y1(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(3);plot(f\_scale,Mag\_Y1); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 500 Hz

f2=500;

fs=20000;

N=0:5000;

t=N/fs;

x2=sin(2\*pi\*f2\*t)

X1=fft(x2);

L=length(N);

Mag\_X2=abs(X1(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(4);plot(f\_scale,Mag\_X2); xlabel('Frequency in Hz');

ylabel('Amplitude');

y2=filter(h,1,x2)

Y2=fft(y2);

L=length(N);

Mag\_Y2=abs(Y2(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(5);plot(f\_scale,Mag\_Y2); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 1500 Hz

f3=1500;

fs=22000;

N=0:5000;

t=N/fs;

x3=sin(2\*pi\*f3\*t)

X3=fft(x3);

L=length(N);

Mag\_X3=abs(X3(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(6);plot(f\_scale,Mag\_X3); xlabel('Frequency in Hz');

ylabel('Amplitude');

figure(1111);plot(t,x3)

y3=filter(h,1,x3)

Y3=fft(y3);

L=length(N);

Mag\_Y3=abs(Y3(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(7);plot(f\_scale,Mag\_Y3); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 3000 Hz

f4=3000;

fs=22000;

N=0:5000;

t=N/fs;

x4=sin(2\*pi\*f4\*t)

X4=fft(x4);

L=length(N);

Mag\_X4=abs(X4(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(8);plot(f\_scale,Mag\_X4); xlabel('Frequency in Hz');

ylabel('Amplitude');

y4=filter(h,1,x4)

Y4=fft(y4);

L=length(N);

Mag\_Y4=abs(Y4(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(9);plot(f\_scale,Mag\_Y4); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 6000 Hz

f5=6000;

fs=22000;

N=0:5000;

t=N/fs;

x5=sin(2\*pi\*f5\*t)

X5=fft(x5);

L=length(N);

Mag\_X5=abs(X5(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(10);plot(f\_scale,Mag\_X5); xlabel('Frequency in Hz');

ylabel('Amplitude');

y5=filter(h,1,x5)

Y5=fft(y5);

L=length(N);

Mag\_Y5=abs(Y5(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(11);plot(f\_scale,Mag\_Y5); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 8000 Hz

f6=8000;

fs=24000;

N=0:5000;

t=N/fs;

x6=sin(2\*pi\*f6\*t)

X6=fft(x6);

L=length(N);

Mag\_X6=abs(X6(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(12);plot(f\_scale,Mag\_X6); xlabel('Frequency in Hz');

ylabel('Amplitude');

y6=filter(h,1,x6)

Y6=fft(y6);

L=length(N);

Mag\_Y6=abs(Y6(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(13);plot(f\_scale,Mag\_Y6); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 1000 Hz

f7=1000;

fs=25000;

N=0:5000;

t=N/fs;

x7=sin(2\*pi\*f7\*t)

X7=fft(x7);

L=length(N);

Mag\_X7=abs(X7(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(14);plot(f\_scale,Mag\_X7); xlabel('Frequency in Hz');

ylabel('Amplitude');

y7=filter(h,1,x7)

Y7=fft(y7);

L=length(N);

Mag\_Y7=abs(Y7(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(15);plot(f\_scale,Mag\_Y7); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 4000 Hz

f8=4000;

fs=19900;

N=0:5000;

t=N/fs;

x8=sin(2\*pi\*f8\*t)

X8=fft(x8);

L=length(N);

Mag\_X8=abs(X8(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(16);plot(f\_scale,Mag\_X8); xlabel('Frequency in Hz');

ylabel('Amplitude');

y8=filter(h,1,x8)

Y8=fft(y8);

L=length(N);

Mag\_Y8=abs(Y8(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(17);plot(f\_scale,Mag\_Y8); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 2000 Hz

f9=2000;

fs=20000;

N=0:5000;

t=N/fs;

x9=sin(2\*pi\*f9\*t)

X9=fft(x9);

L=length(N);

Mag\_X9=abs(X9(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(19);plot(f\_scale,Mag\_X9); xlabel('Frequency in Hz');

ylabel('Amplitude');

y9=filter(h,1,x9)

Y9=fft(y9);

L=length(N);

Mag\_Y9=abs(Y9(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(20);plot(f\_scale,Mag\_Y9); xlabel('Frequency in Hz');

ylabel('Amplitude');

% Ytotlal

N=0:5000;

fs=24000;

Ytotal=Y1+Y2+Y3+Y4+Y5+Y6+Y7+Y8;

L=length(N);

Mag\_Yto=abs(Ytotal(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(18);plot(f\_scale,Mag\_Yto); xlabel('Frequency in Hz');

ylabel('Amplitude');

ปราสาท

clear all;

clc;

%??????

N=200;

alpha=(N/2)-1;

upper\_limit=(N/2)-1;

Fs=20000;

H=[0 0 0 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 31.6228 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ];

m=1;

for n=0:(N-1);

for k=1:upper\_limit

inner(k)=2\*abs(H(k+1))\*cos(abs(2\*pi\*k\*(n-alpha)/N));

end

tot\_inner=sum(inner)+H(0+1);

h(m)=(1/N)\*tot\_inner;

m=m+1;

end

[H,q]=freqz(h,1,512,Fs);

amp\_resp=abs(H);

phase\_resp=angle(H);

figure(1);plot(q,amp\_resp);

title('amplitude response of nonrecursive frequency sampling FIR filter');

xlabel('Frequency in Hz');ylabel(' Amplitude');axis([0 Fs/2 0 100]); grid;

%sine 250 Hz

f1=250;

fs=3000;

N=0:5000;

t=N/fs;

x1=sin(2\*pi\*f1\*t)

X1=fft(x1);

L=length(N);

Mag\_X1=abs(X1(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(2);plot(f\_scale,Mag\_X1); xlabel('Frequency in Hz');

ylabel('Amplitude');

y1=filter(h,1,x1)

Y1=fft(y1);

L=length(N);

Mag\_Y1=abs(Y1(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(3);plot(f\_scale,Mag\_Y1); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 500 Hz

f2=500;

fs=20000;

N=0:5000;

t=N/fs;

x2=sin(2\*pi\*f2\*t)

X1=fft(x2);

L=length(N);

Mag\_X2=abs(X1(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(4);plot(f\_scale,Mag\_X2); xlabel('Frequency in Hz');

ylabel('Amplitude');

y2=filter(h,1,x2)

Y2=fft(y2);

L=length(N);

Mag\_Y2=abs(Y2(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(5);plot(f\_scale,Mag\_Y2); xlabel('Frequency in Hz');

ylabel('Amplitude');

% sine 1000 Hz

f3=1000;

fs=20000;

N=0:5000;

t=N/fs;

x3=sin(2\*pi\*f3\*t)

X3=fft(x3);

L=length(N);

Mag\_X3=abs(X3(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(6);plot(f\_scale,Mag\_X3); xlabel('Frequency in Hz');

ylabel('Amplitude');

y3=filter(h,1,x3)

Y3=fft(y3);

L=length(N);

Mag\_Y3=abs(Y3(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(7);plot(f\_scale,Mag\_Y3); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 2000 Hz

f4=2000;

fs=20000;

N=0:5000;

t=N/fs;

x4=sin(2\*pi\*f4\*t)

X4=fft(x4);

L=length(N);

Mag\_X4=abs(X4(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(8);plot(f\_scale,Mag\_X4); xlabel('Frequency in Hz');

ylabel('Amplitude');

y4=filter(h,1,x4)

Y4=fft(y4);

L=length(N);

Mag\_Y4=abs(Y4(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(9);plot(f\_scale,Mag\_Y4); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 3000 Hz

f5=3000;

fs=24000;

N=0:5000;

t=N/fs;

x5=sin(2\*pi\*f5\*t)

X5=fft(x5);

L=length(N);

Mag\_X5=abs(X5(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(10);plot(f\_scale,Mag\_X5); xlabel('Frequency in Hz');

ylabel('Amplitude');

y5=filter(h,1,x5)

Y5=fft(y5);

L=length(N);

Mag\_Y5=abs(Y5(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(11);plot(f\_scale,Mag\_Y5); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 4000 Hz

f6=4000;

fs=19000;

N=0:5000;

t=N/fs;

x6=sin(2\*pi\*f6\*t)

X6=fft(x6);

L=length(N);

Mag\_X6=abs(X6(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(12);plot(f\_scale,Mag\_X6); xlabel('Frequency in Hz');

ylabel('Amplitude');

y6=filter(h,1,x6)

Y6=fft(y6);

L=length(N);

Mag\_Y6=abs(Y6(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(13);plot(f\_scale,Mag\_Y6); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 6000 Hz

f7=6000;

fs=18000;

N=0:5000;

t=N/fs;

x7=sin(2\*pi\*f7\*t)

X7=fft(x7);

L=length(N);

Mag\_X7=abs(X7(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(14);plot(f\_scale,Mag\_X7); xlabel('Frequency in Hz');

ylabel('Amplitude');

y7=filter(h,1,x7)

Y7=fft(y7);

L=length(N);

Mag\_Y7=abs(Y7(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(15);plot(f\_scale,Mag\_Y7); xlabel('Frequency in Hz');

ylabel('Amplitude');

%sine 8000 Hz

f8=8000;

fs=24000;

N=0:5000;

t=N/fs;

x8=sin(2\*pi\*f8\*t)

X8=fft(x8);

L=length(N);

Mag\_X8=abs(X8(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(16);plot(f\_scale,Mag\_X8); xlabel('Frequency in Hz');

ylabel('Amplitude');

y8=filter(h,1,x8)

Y8=fft(y8);

L=length(N);

Mag\_Y8=abs(Y8(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(17);plot(f\_scale,Mag\_Y8); xlabel('Frequency in Hz');

ylabel('Amplitude');

%

% Ytotlal

N=0:5000;

fs=24000;

Ytotal=Y1+Y2+Y3+Y4+Y5+Y6+Y7+Y8;

L=length(N);

Mag\_Yto=abs(Ytotal(1:L/2)./(L/2));

f\_scale=(0:(L/2)-1).\*(fs/L);

figure(18);plot(f\_scale,Mag\_Yto); xlabel('Frequency in Hz');

ylabel('Amplitude');