close all, clear all;

fs = 8000;

ws = 1150\*2\*pi/fs;

wp = 1000\*2\*pi/fs;

wc = 0.5\*(wp+ws);

tb=(ws-wp)/2; %transition bandwidth

N=(8\*pi)/tb;

N=ceil(N);

h=zeros(1,N);

for n=1:N

h(n)=sin(wc\*(n-ceil(N/2)))/(pi\*(n-ceil(N/2))); %impulse response of LPF

end

h(ceil(N/2))=wc/pi;

n=1:N;

for i=1:N

w(i)=0.54-0.46\*cos(2\*pi.\*i/(N-1)); %Hamming window

end

hw=(h.\*w); %windowing

figure

stem(hw);

xlabel('n');

ylabel('h[n]');

title('Impulse response of low pass filter after windowing');

hfft=fft(hw,1024);

x=-0.5:1/(length(hfft)-1):0.5;

figure

plot(2\*x,(abs(fftshift(fft(hw,1024)))));

xlabel('Normalised Frequency');

ylabel('Magnitude(not in dB)');

title('LPF with ideal characteristics');

figure

plot(2\*x,20\*log10(abs(fftshift(fft(hw,1024)))));

xlabel('Normalised Frequency');

ylabel('Magnitude (dB)');

title('LPF with ideal characteristics');