Digital Signal Processing Lab

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Lab Report

Lab Work:-

Lab – 7

1).

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% -> Write a program to design and test  digital IIR lowpass Butterworth
%    Prototype Filter with a passband edge of 500 Hz, a stopband edge of 2KHz,
%    Passband ripple of 1 dB, stopband attenuation of 20 dB and a sampling
%    frequency of 8KHz using impulse invariance method.
%
% -> Study and use Buttord,Butter,Impinvar, freqz.

clc;
clear;

Fs = 8000; % Hz Sampling Frequency

Wp = 500/(Fs/2);   % Hz
Ws = 2000/(Fs/2);  % Hz

ripple = 1; % dB
amin = 20;  %dB

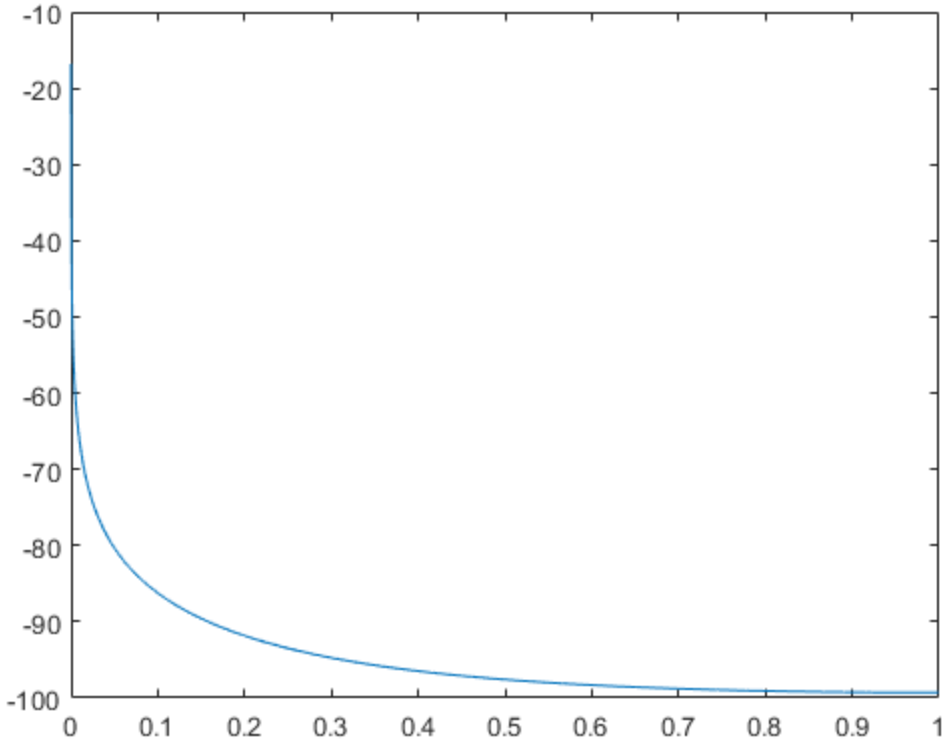
[n,Wo] = buttord(Wp,Ws,ripple,amin, 's'); % Finding Order(n) and Cutoff Frequency(Wo)
of the filter

[b,a] = butter(n,Wo);   % Making Filter, [a,b] are transfer function coefficients

[bz,az] = impinvar(b,a,Fs);  % Analog to Digital filter conversion

[h,w] = freqz(bz,az,2001);

plot(w/pi,20*log10(abs(h)));
```



2).

```
% -> Design 4th Order Chebyshev-I Bandpass Filter with lower cutoff frequency
%    wL =0.3p, passband, ripple 0.11 and higher cutoff frequencywH = 0.6p, using
%    impulse invariance method for sampling time T=0.1
% -> Study Cheby1   :  Lp2bp

clc;
clear;

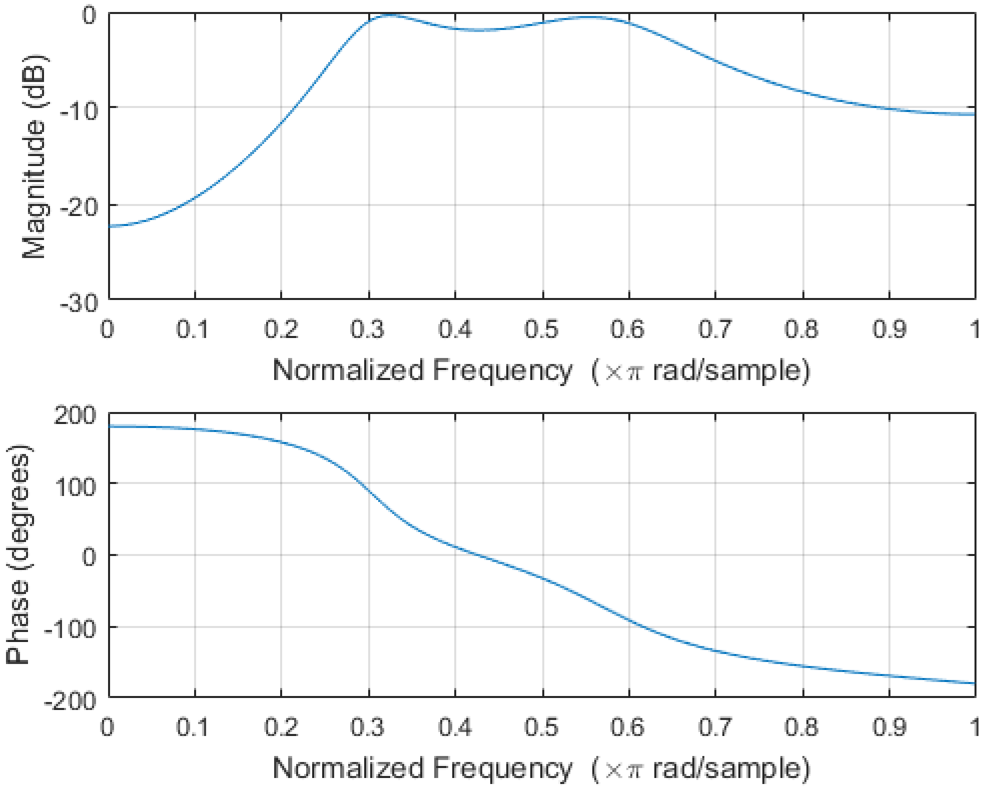
Fs = (1/0.1);
n = 2;              % Filter Order
Rp = (-20*log10(1-0.11));

Wp = 1;
Wh = 0.6*pi*Fs;
Wl = 0.3*pi*Fs;

Wo = sqrt(Wh*Wl);   % Cutoff Frequency
bandwidth = Wh-Wl;
[b,a] = cheby1(n,Rp,Wp,'s');
[bc,ac] = lp2bp(b,a,Wo,bandwidth);

[bz,az] = impinvar(bc,ac,Fs);

freqz(bz,az);
```



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