

# YANKEE BUSH SOFTWARE LLC



Digital IIR Low-Pass  
Filter Design Using the  
Chebyshev-I Prototype

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## Problem Description

Design a digital IIR lowpass filter using the Chebyshev-I prototype to meet the following specifications:

$$\begin{aligned}\omega_p &= 0.22\pi, & R_p &= 0.5dB \\ \omega_s &= 0.32\pi, & A_s &= 20\text{ dB}\end{aligned}$$

Plot the magnitude response, the phase response, the magnitude in dB and the group delay.



## Matlab Source Code

```
%Design of digital IIR low pass filter using chebyshev-I prototype
```

```
clc;
```

```
clear all;
```

```
wp=0.22 ;% normalised frequency
```

```
ws=0.32;
```

```
Rp=0.5;% in db
```

```
As=20;% in db
```

```
[n wn]=cheb1ord(wp,ws,Rp,As);
```

```
[b a]=cheby1(n,Rp,wn);
```

```
fvtool(b,a);
```

```
h=fvtool(b,a,'analysis','phase');
```

```
hFVT = fvtool(b,a,'Analysis','grpdelay');
```

```
set(hFVT,'NumberofPoints',128);
```

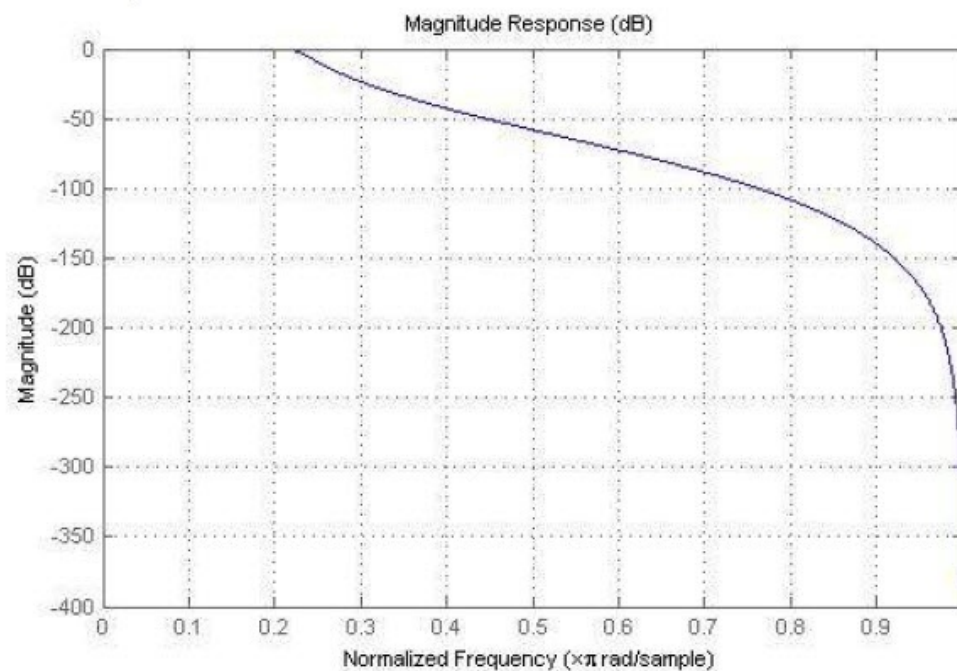
M  
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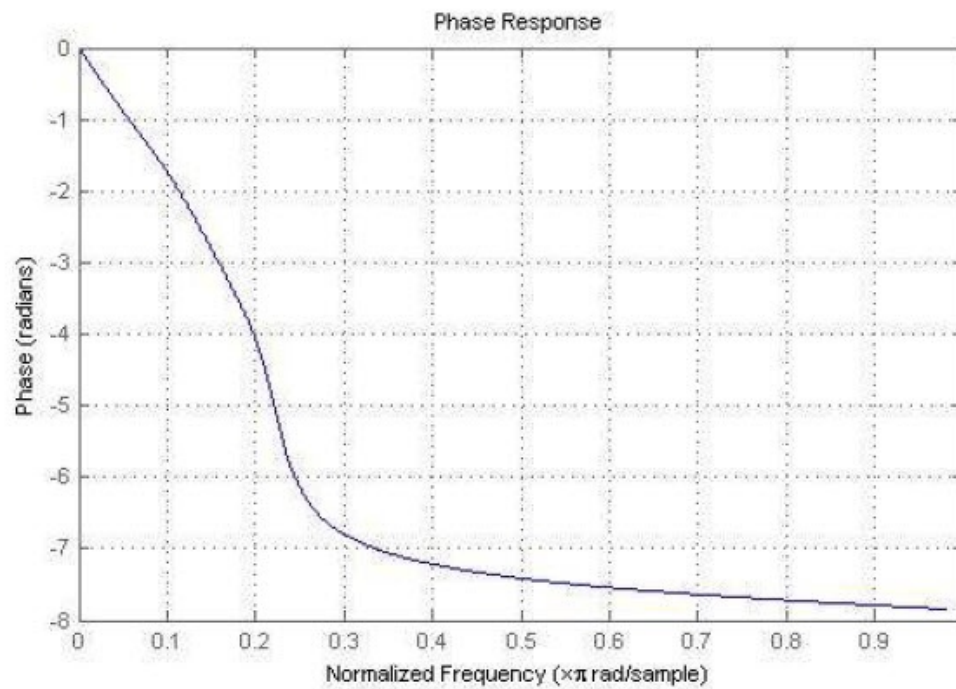


## Simulations

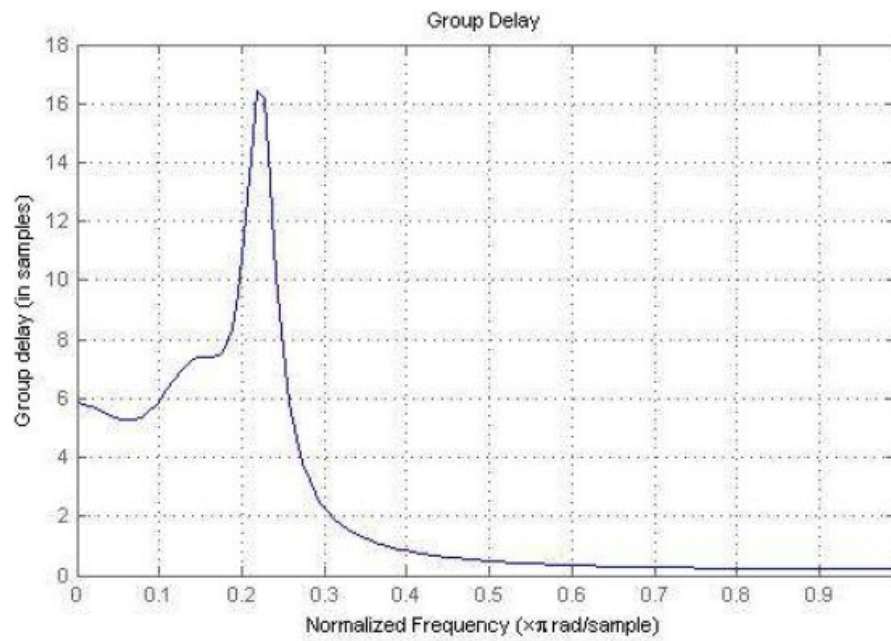
# MAGNITUDE RESPONSE(MAGNITUDE IN DB)



# PHASE RESPONSE(MAGNITUDE IN DB)



# GROUP DELAY





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