

## Chebyshev filter type I

Chebyshev filter type I has a equiripple magnitude response in passband . In the following example we show how the Chebyshev filter type I or cheby1 can be designed for all four major types of filters. First, we start with a low pass filter of order 4, with a passband edge at 0.5Hz, passband ripple at 1dB, and sampling frequency at 2Hz.

`CFlo := cheby1lohi(4 , "low" , 0.5 , 1 , 2)` Design of a lowpass Chebyshev I filter

`A1 := col2vec(CFlo , 1)` Denominator coefficients

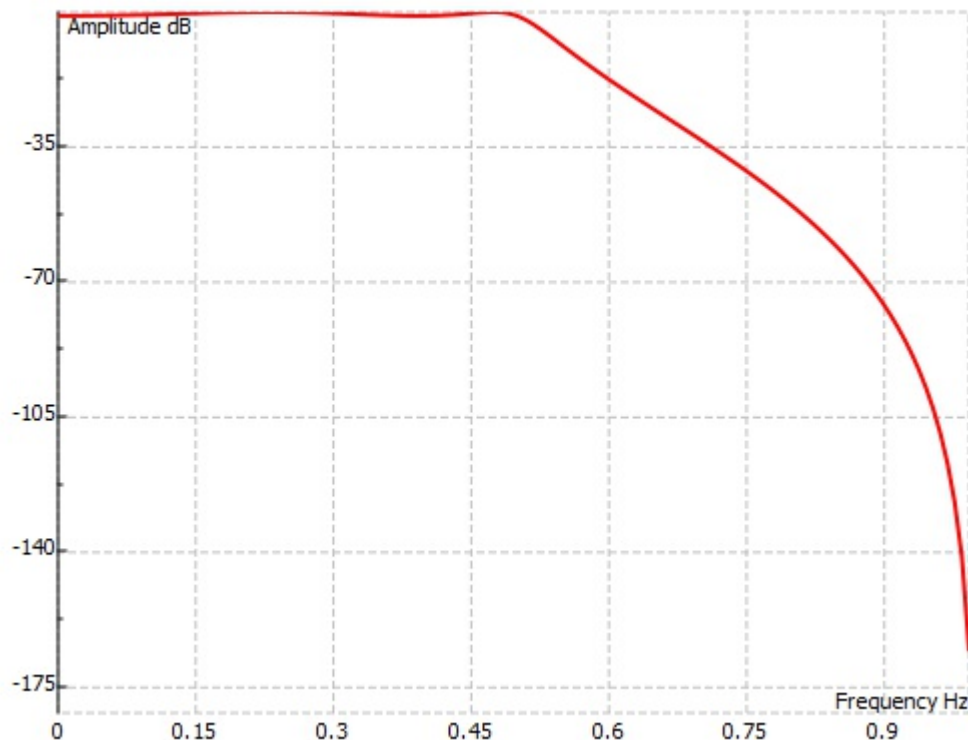
`B1 := col2vec(CFlo , 0)` Numerator coefficients

`Flo := iirfreqres(A1 , B1 , 128 , 1)` Frequency response of the filter

`fre := ynodes(z , 0 , 1 - 1/128 , 128)` Frequency axis

`Flog := join mat cols( fre , 20 log10( fabs(Flo) ) )` Graph of the amplitude response

Frequency response of the lowpass Chebys



Next, we design a high pass filter of order 4, with passband edge at 500Hz, passband ripple at 1dB and sampling frequency at 2000Hz.

```
CFhi := cheby1lohi(4 , "high" , 500 , 1 , 2000)
```

```
A2 := col2vec(CFhi , 1)
```

```
B2 := col2vec(CFhi , 0)
```

```
Fhi := iirfreqres(A2 , B2 , 128 , 1)
```

```
Fhi := join mat cols( fre · 2000/2 , 20 log10(fabs(Fhi)) )
```

Amplitude response of the highpass Cebys

