Chebyshev filter type I - bandstop and bandpass case

In a sequel, we design a cheby1 filter for both bandpass and bandstop cases. In this case the cheby1band function is used, it has the following arguments: integer filter order, string or integer filter type ("pass"=0, or "stop"=1), lower passband edge in Hz, and upper passband edge in Hz, passband edge and sampling rate in Hz. We design a bandpass case first with, a order of 6, and lower passband edge at 600Hz, upper passband edge at 1200Hz, passband ripple 1dB and a sampling frequency of 3000Hz.

CFIpass := cheby1band(6 , "pass" , 600 , 1200 , 1 , 3000) Design of Cheby 1 lowpass filter

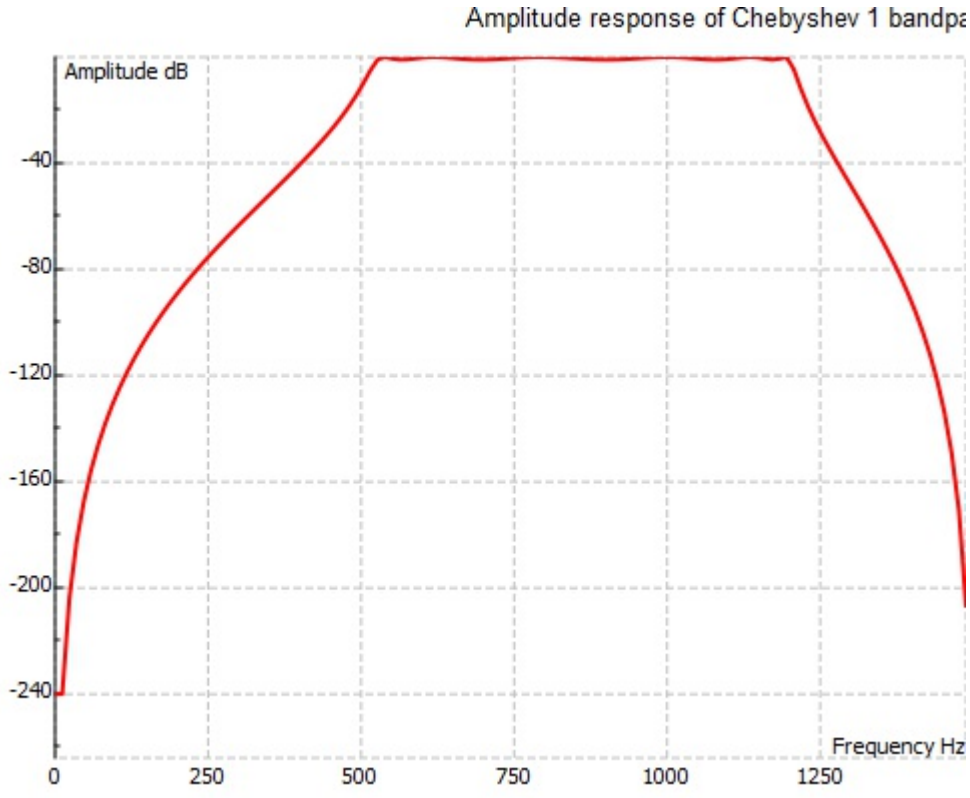
A1 := col2vec(CFIpass , 1) Denominator coefficients

B1 := col2vec(CFIpass , 0) Numerator coefficients

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

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

Fpassg := join mat cols(1500 fre , 20 log10(fabs(Fpass)))



Next, we design a bandstop filter of order 6, lower passband edge at 600Hz, upper passband edge at 1200Hz, passband ripple of 1dB and a sampling frequency of 3000Hz.

CFIstop := cheby1band(6 , "stop" , 600 , 1200 , 1 , 3000) Filter Design

A2 := col2vec(CFIstop , 1)

$B2 := \text{col2vec}(CFIstop, 0)$

$Fstop := \text{iirfreqres}(A2, B2, 128, 1)$

$Fstopg := \text{join mat cols}\left(1500\ fre, 20\ \log10\left(\text{fabs}(Fstop)\right)\right)$ Frequency response of Cheby 1 bandstop filter