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.

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

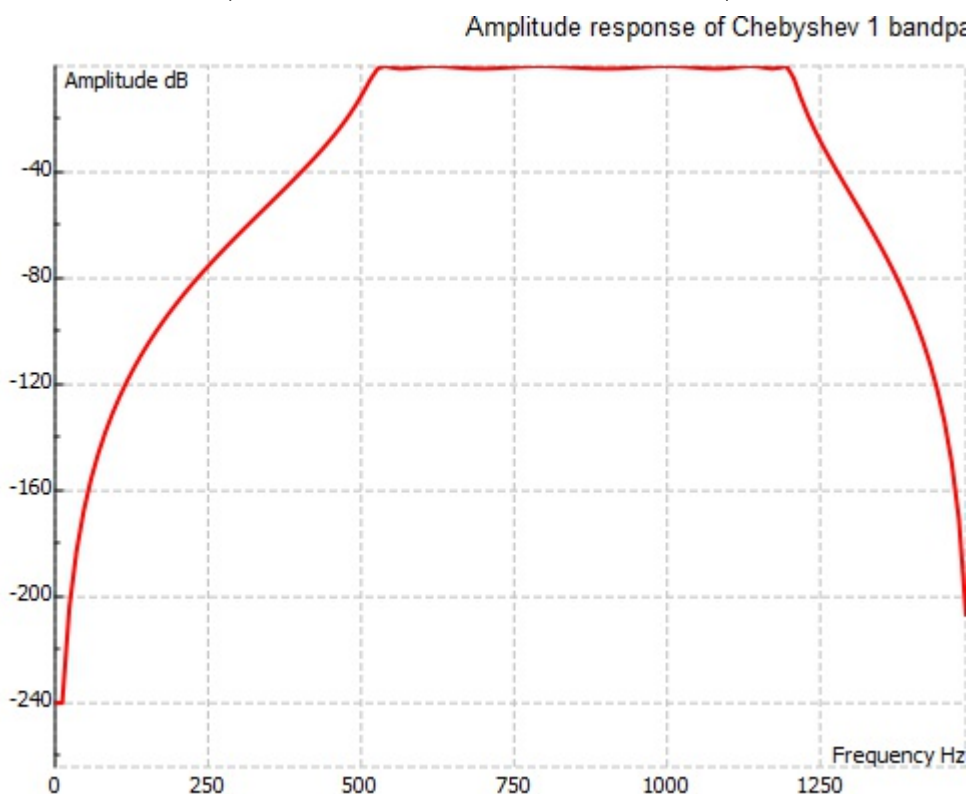$A1 := col2vec(CFlpass, 1)$ Denominator coefficients

$B1 := col2vec(CFlpass, 0)$ Numerator coefficients

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

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

$Fpassg := join\ mat\ cols\left(1500\ fre, 20\ log10\left(fabs(Fpass)\right)\right)$

Amplitude response of Chebyshev 1 bandpa

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.

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

$A2 := col2vec(CFlstop, 1)$

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

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

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

Amplitude response of Chebyshev 1 bandst

Amplitude dB

-40

-80

-120

-160

-200

-240

Frequency Hz

0   250   500   750   1000   1250