EE 678

Midsem

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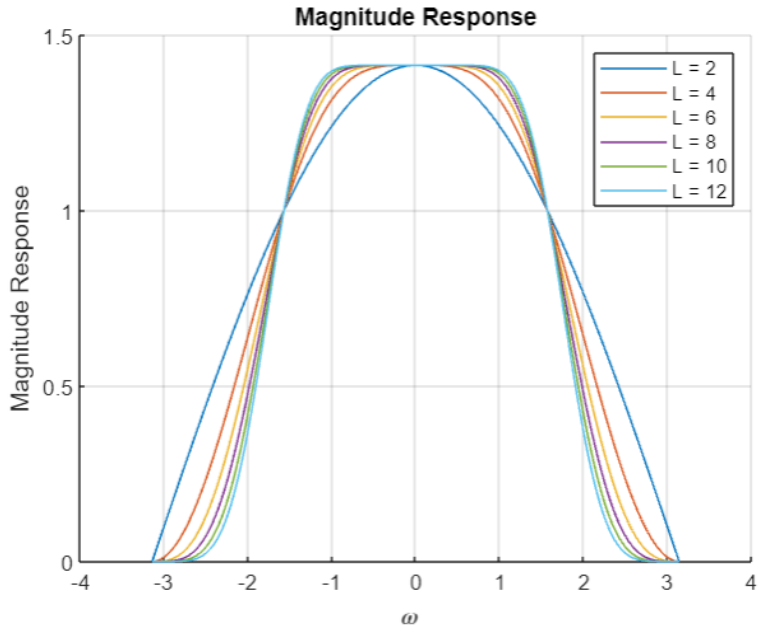
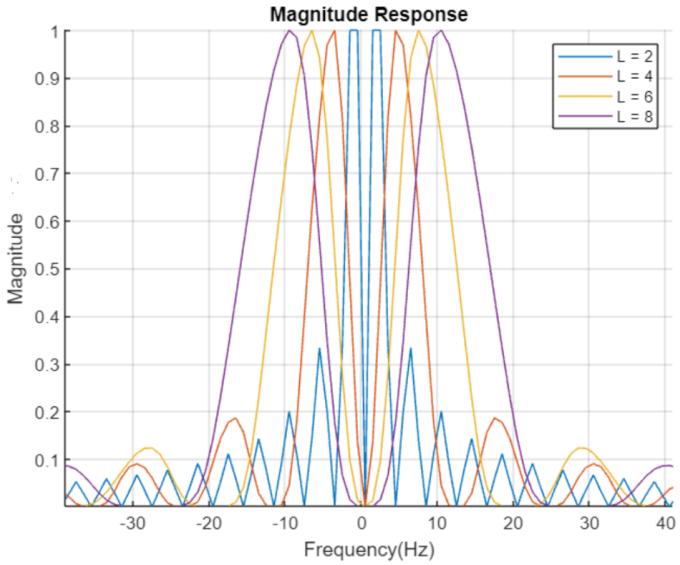
I Question 2

§ Part A - Obtain the frequency responses of the Daubechies' analysis lowpass filters that you have generated and have them plotted on one graph, for comparison

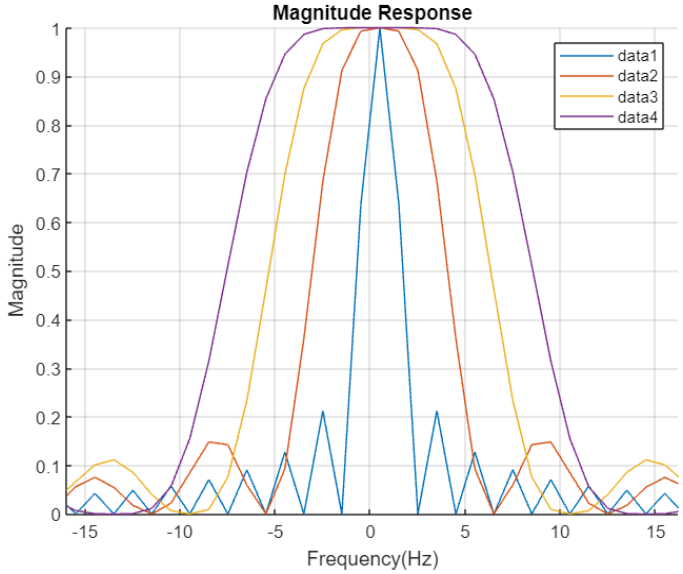


Magnitude response of DTFT of Analysis low pass filter

§ Part B - Obtain a reasonable plot of the Fourier Transform of the Scaling Functions and Wavelets that you have generated in Q1(b) above



Magnitude response of Normalized Fourier Transform of Wavelet function



Magnitude response of Normalized Fourier Transform of Scaling function

II Insights

For the DTFT of lowpass analysis filter, as we increase the length the transition band becomes steeper and the fitler moves towards the characteristics of an ideal low-pass filter. We observe that the output waveform for L = 2 is indeed of the shape cos(ω/2) which we studied in the class.

The scaling function represents low pass nature of the filter.As seen from the fourier transform of scaling functions as L increases have wider main lobe which implies have smoother low pass characteristics and retain more frequencies.

The wavelet function represents the high pass nature of the filter .As seen from the fourier transform wavelet function as L increases the main lobe separation between two primary lobes increases which implies the low frequency components are diminishing.

The code for the exam is available here