

EE 451: Homework 7

1. Given the frequency samples

$$H_r\left(\frac{2\pi}{65}k\right) = \begin{cases} 1 & k = 0, 1, \dots, 16 \\ 0 & k = 17, \dots, 32 \end{cases}$$

and the phase is linear with delay equal to $(M - 1)/2$, plot the frequency response $H_1(\omega)$.

2. Given the frequency samples

$$H_r\left(\frac{2\pi}{65}k\right) = \begin{cases} 1 & k = 0, 1, \dots, 16 \\ 0.5886 & k = 17 \\ 0.1065 & k = 18 \\ 0 & k = 19, \dots, 32 \end{cases}$$

and the phase is linear with delay equal to $(M - 1)/2$, plot the frequency response $H_2(\omega)$ and compare the results with the previous frequency response $H_1(\omega)$ obtained from the previous problem.

3. Use MATLAB to design the same filter using `firpm` and compare with your previous results.
4. Design a bandpass filter with band edges 1.75kHz and 2.5kHz, transition band of 250Hz, passband ripple of 0.1dB and stopband attenuation of 30dB. Compare the two approaches of equiripple and frequency sampling. Use the same order computed using the `firpmord` function.
5. #10.1 from textbook
6. #10.5 from textbook