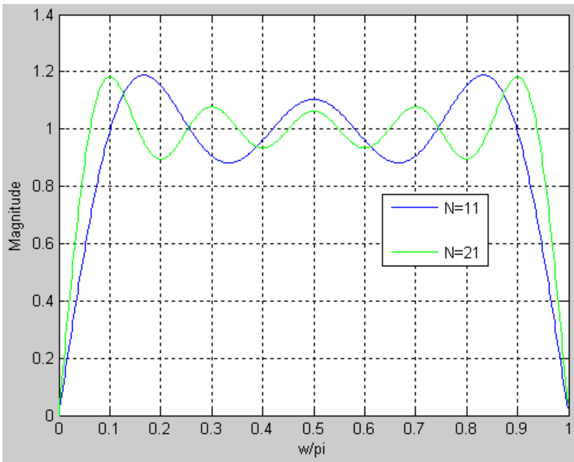
EE 451 – HW6

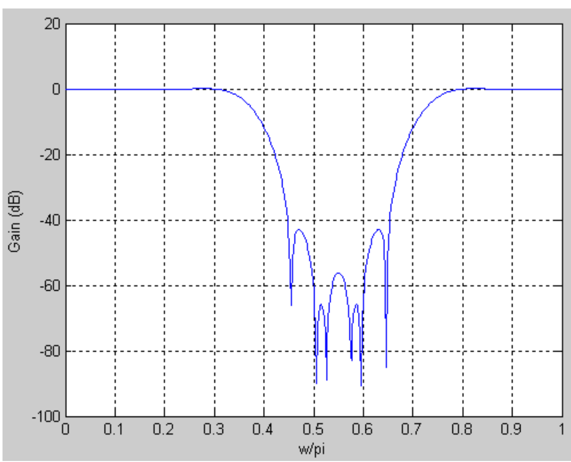
10.5

$$h_{HT}[n] = \begin{cases} h_{HT}[n] = 2/\pi n & n \quad odd \\ h_{HT}[n] = 0 & n \quad even \end{cases}$$

The plot of the frequency response of the truncated Hilbert Transformer



10.17 A Hanning window gives the smallest length.
The plot of the magnitude response of the bandstop FIR filter



10.21 (a)

$$r[n-D] = \sum_{k=0}^{M} Ak\sin(kw_0 n + \phi k - 2\pi k) = r[n]$$

(b)

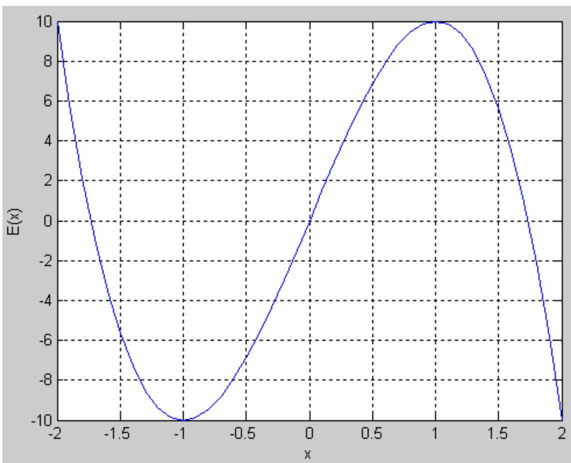
$$y[n] = s[n] + r[n] - s[n-D] - r[n-D]$$
$$= s[n] + r[n] - s[n-D] - r[n] = s[n] - s[n-D]$$

Hence y[n] does not contain any harmonics disturbances

10.38

$$W(w) = \begin{cases} 1.43 & 0 \le w \le 0.44\pi \\ 1 & 0.55 \le w \le 0.7\pi \\ 5 & 0.82 \le w \le \pi \end{cases}$$

M10.7 The solution yields: a_0=5.5, a_1=-7.0, a_2=-0.2, ε=10.0. It turns out to be the maximum error at the specific points [x_1, …,x_4].
The plot of the error is shown below



10.25 Using firpmord and firpm programs we find that an appropriate filter length is N=43.