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Audio filtering

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Parameter	Description
x(n)	Input Audio Signal
y(n)	Output Audio Signal
H(z)	Discrete Time Fourier Transform of x(n)
h(n)	Impulse Response

TABLE 1: Input Table

Frequency Response of Input Audio signal x(n), given as:

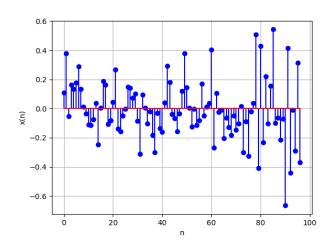


Fig. 1: Graph of x(n)

The Output response can be obtained from Difference equation, given as :

$$\sum_{m=0}^{M} a(m) y(n-m) = \sum_{k=0}^{N} b(k) x(n-k)$$
 (1)

The values of a and b are obtained in 'filter.py' file.



$$y[n] \stackrel{\mathcal{F}}{\longleftrightarrow} Y(\omega)$$
 (3)

$$h[n] \stackrel{\mathcal{F}}{\longleftrightarrow} H(\omega)$$
 (4)

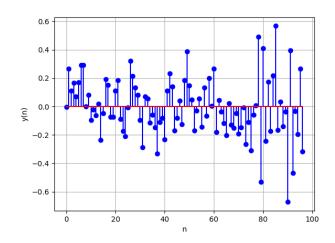


Fig. 2: Graph of y(n)

The plot of $H(\omega)$ is given as :

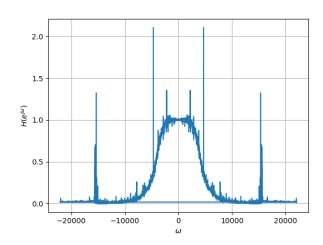


Fig. 3: Graph of $H(\omega)$

$$H(\omega)$$
 is taken as : $\frac{X(\omega)}{Y(\omega)}$

$$H(\omega) \overset{\mathcal{F}^{-1}}{\longleftrightarrow} h(n) \tag{5}$$

Taking Inverse fourier transform of $H(\omega)$

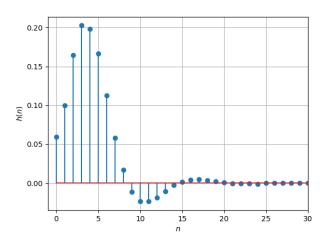


Fig. 4: Graph of h(n)