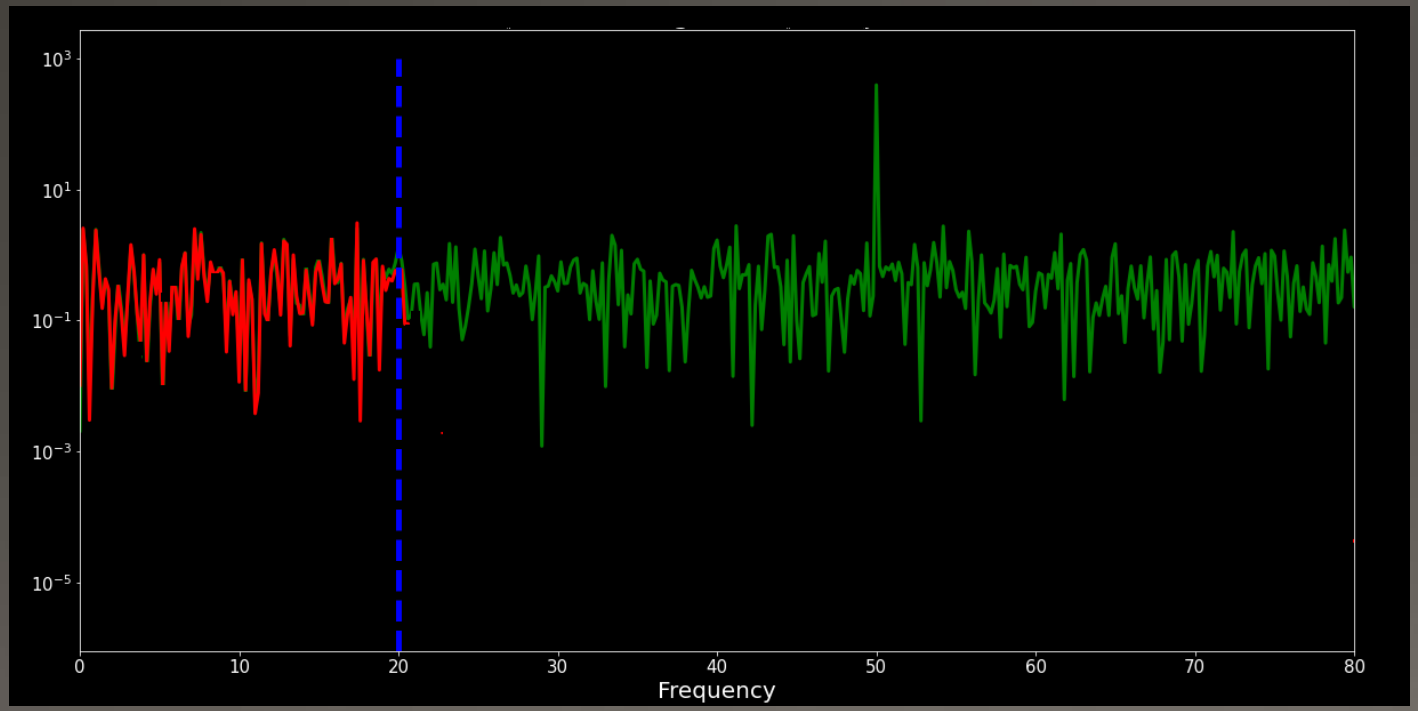
Iqraq's Note

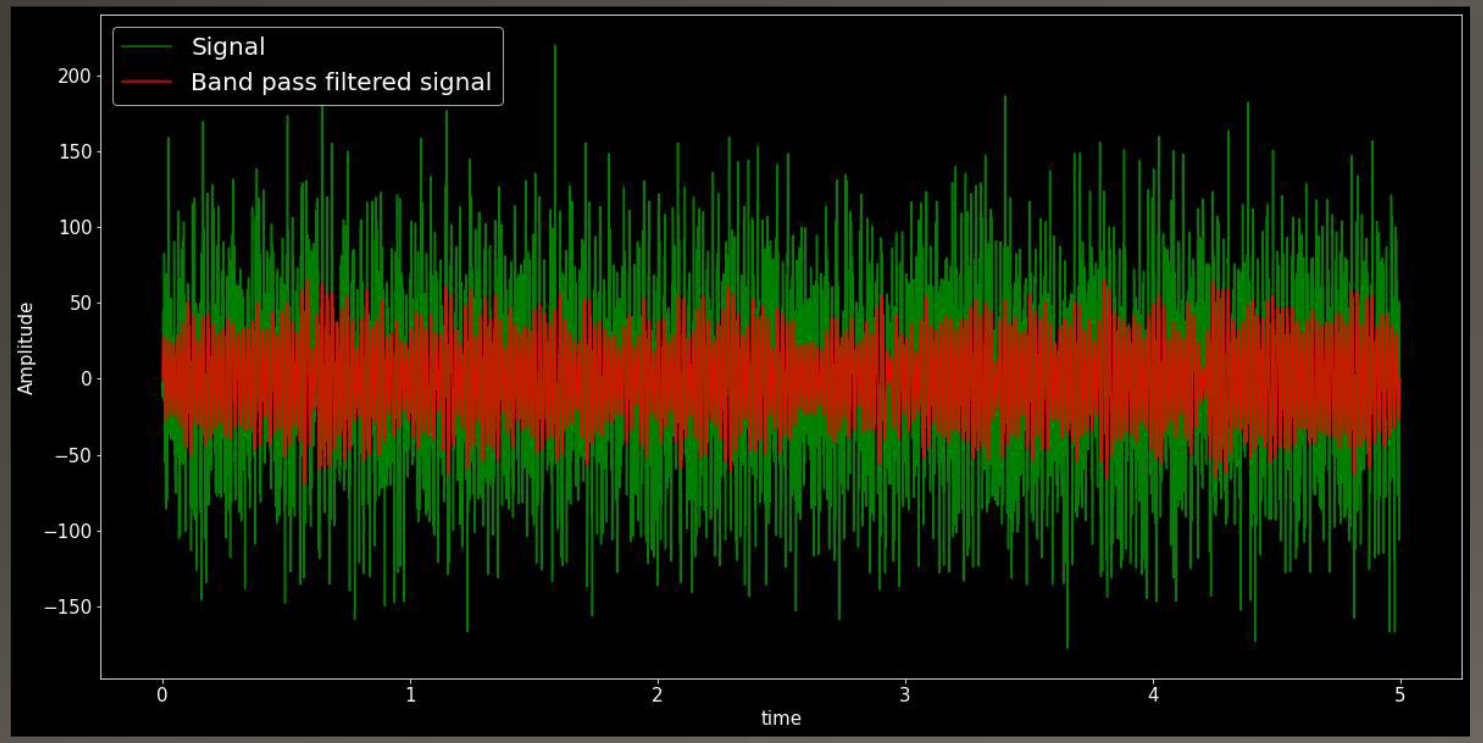
Digital Filters

Why Digital Filters?

- Used for signal separation
- Ie – Signal that have different frequency (spectrally separable)



- Used for signal Restoration
- Ie – restoring signal that is corrupted by noise



Impulse response filter types

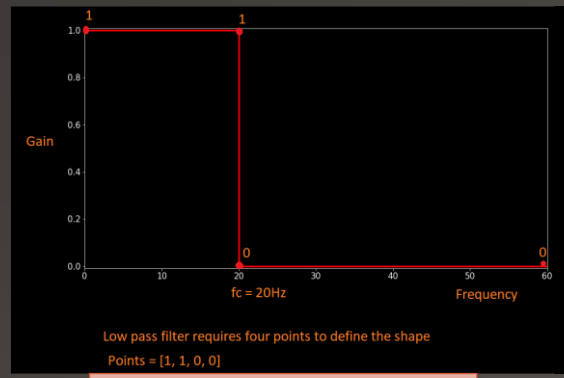
- Finite Impulse Response (FIR)
- Filter whole impulse response to any finite length input signal is of finite duration. This is because it converges to zero in a short time and thus it is a stable filter

- Infinite Impulse Response (IIR)

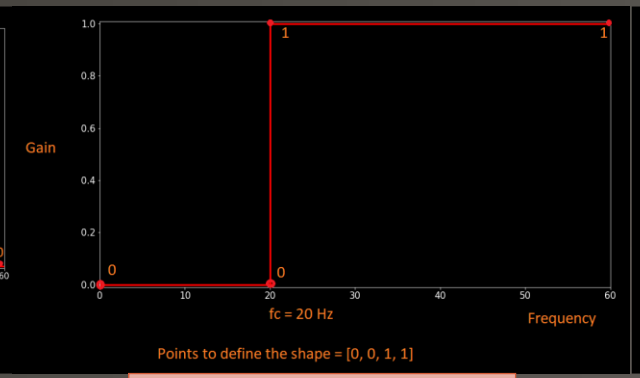
- Filter have impulse response which does not converge to zero over infinite length of time. Thus they are unstable filter

Steps to design FIR filter

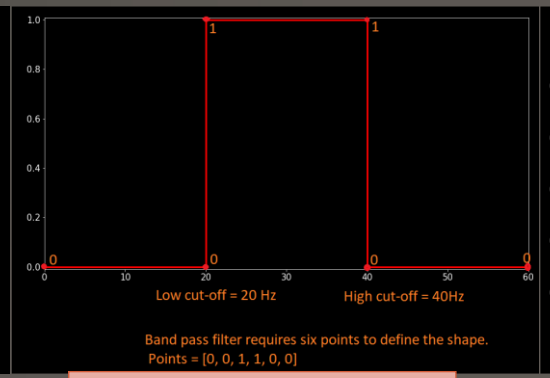
1 . Define frequency domain shapes and cut offs



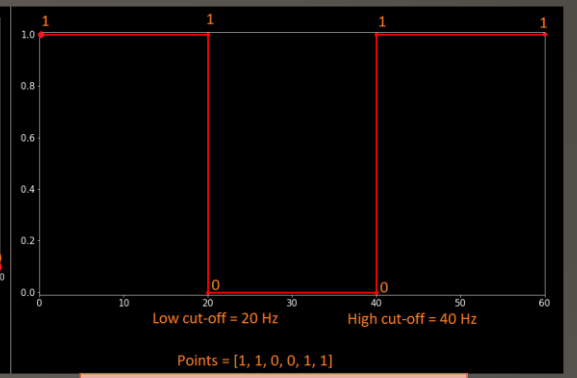
Low pass filter



High Pass Filter



Band pass filter



Band Stop filter

Comparison Between FIR and IIR Filters

FIR Filters	IIR Filters
Short Impulse Respone	Long Impulse Response
Slow due to large order	Fast due to small order
Inherently Stable	Stability depend upon the data
High performance due to flexibility in designing	Low performance and less flexibility
Non Recursive Filters	Recursive Filters