

How to implement a filter using scipy.signal

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Command

$nyqrate = \text{sampling rate} / 2$

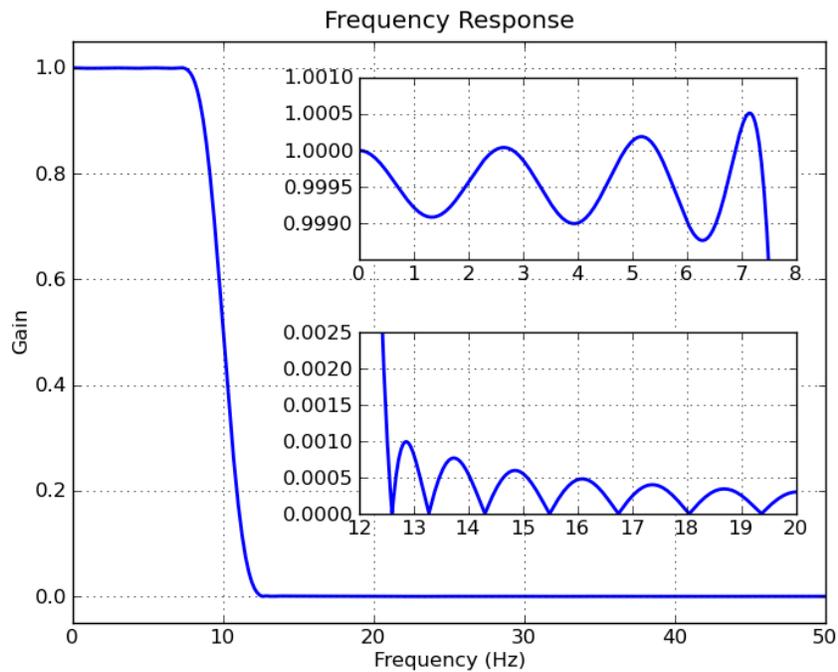
$\text{Cutoff_frequency_in_nyqrate} = \text{cutoff_frequency} / nyqrate$

```
b1 = signal.firwin(ORDER, Cutoff_frequency_in_nyqrate)
w1, h1 = signal.freqz(b1)
```

Ex:

If $\text{cutoff_frequency} = 10$, then $\text{Cutoff_frequency_in_nyqrate}$ as

$\text{Cutoff_frequency_in_nyqrate} = 10 / nyqrate$



example

```

>>> import numpy as np
>>> import scipy.signal as signal
>>> import matplotlib.pyplot as plt

>>>
>>> b1 = signal.firwin(40, 0.5)
>>> b2 = signal.firwin(41, [0.3, 0.8])
>>> w1, h1 = signal.freqz(b1)
>>> w2, h2 = signal.freqz(b2)

>>>
>>> plt.title('Digital filter frequency response')
>>> plt.plot(w1, 20*np.log10(np.abs(h1)), 'b')
>>> plt.plot(w2, 20*np.log10(np.abs(h2)), 'r')
>>> plt.ylabel('Amplitude Response (dB)')
>>> plt.xlabel('Frequency (rad/sample)')

```

```
>>> plt.grid()
>>> plt.show()
```

References

1. <https://docs.scipy.org/doc/scipy/reference/tutorial/signal.html>
2. <https://scipy.github.io/old-wiki/pages/Cookbook/FIRFilter.html>