

Pweave Example - Frequency response of a moving average filter

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June 26, 2014

Create 11 point moving average filter and plot its frequency response and print the values.

```
import matplotlib.pyplot as plt
import numpy as np
import scipy.signal as signal
#A function to plot frequency and phase response
def mfreqz(b,a=1):
    w,h = signal.freqz(b,a)
    h = abs(h)
    return(w/max(w), h)
```

Make the impulse response function and use terminal formatted output (=doctest block.)

```
>>> n = 11.
>>> n
11.0
>>> b = np.repeat(1/n, n)
>>> b
array([ 0.09090909,  0.09090909,  0.09090909,  0.09090909,  0.09090909,
        0.09090909,  0.09090909,  0.09090909,  0.09090909,  0.09090909,
        0.09090909])
```

Calculate the frequency response and plot it:

```

w, h = mfreqz(b)
#Plot the function
plt.plot(w,h,'k')
plt.ylabel('Amplitude')
plt.xlabel(r'Normalized Frequency ( $x\pi$ rad/sample)')
plt.show()

```

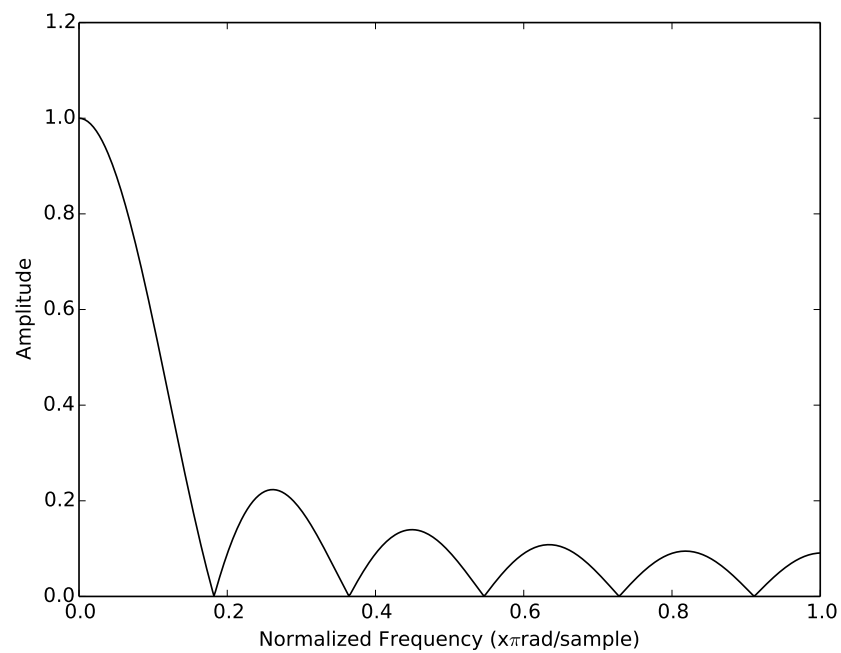


Figure 1: Frequency response of an 11 point moving average filter

Table 1: The first 10 values of the frequency response (w,h) as a table, notice that the code is hidden in the output document.

Amplitude	Frequency
1.0	0.0
1.0	0.0
1.0	0.0
1.0	0.01
1.0	0.01
1.0	0.01
0.99	0.01
0.99	0.01
0.99	0.02
0.98	0.02