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Batch: TA-3
Date: 31/08/2023
Time: 14:00

## Problem Statement: Design a digital FIR Band Reject Filter using Rectangular Window. The following specfications are:

## Lower cut-off Frequency = 0.25pi & Higher cut-off Frequency = 0.4pi

## Length = 51

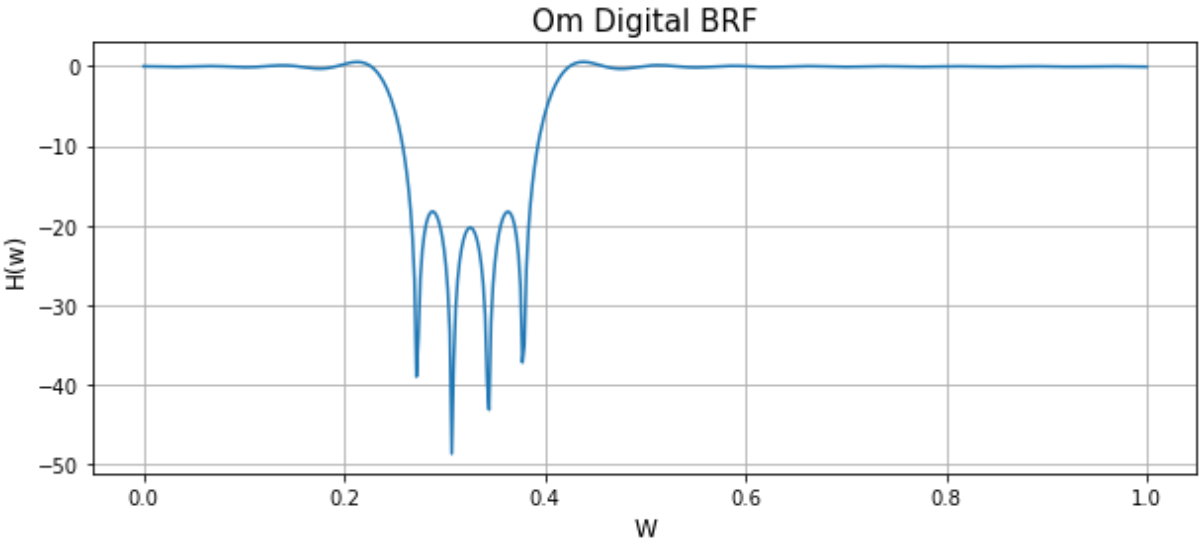
In [1]:
```
# Importing in-built libraries of python
import numpy as np
import matplotlib.pyplot as plt
import scipy.signal as signal
```

In [2]:
```
# Design of FIR BRF using Rectangular Window
N = 51 # Type - I
b = signal.firwin(N, [0.25, 0.4], window = 'rect', pass_zero = True)
a = 1
print(np.round(b, decimals = 2))
```

```
[ 0.01  0.01 -0.   -0.02 -0.03 -0.    0.03  0.03  0.   -0.02 -0.01 -0.
 -0.   -0.02 -0.01  0.03  0.06  0.02 -0.06 -0.1  -0.04  0.08  0.14  0.07
 -0.08  0.85 -0.08  0.07  0.14  0.08 -0.04 -0.1  -0.06  0.02  0.06  0.03
 -0.01 -0.02 -0.   -0.   -0.01 -0.02  0.    0.03  0.03 -0.   -0.03 -0.02
 -0.    0.01  0.01]
```

In [3]:
```
W, h = signal.freqz(b,a)
h_db = 20 * np.log10(abs(h))
plt.figure (figsize = (10, 4))
plt.plot (W/max(W), h_db)
plt.grid()
plt.title ('Om Digital BRF', fontsize = 15)
plt.xlabel ('W', fontsize = 12)
plt.ylabel ('H(w)', fontsize = 12)
```

Out[3]: Text(0, 0.5, 'H(w)')


Om Digital BRF
H(w)
W
0
−10
−20
−30
−40
−50
0.0
0.2
0.4
0.6
0.8
1.0