Name: Om Kadam
Roll No: 45
Sem: V
Branch: EXTC
Year of Study: TE
Division: A
Batch: TA-3
Date: 31/08/2023
Time: 14:00

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

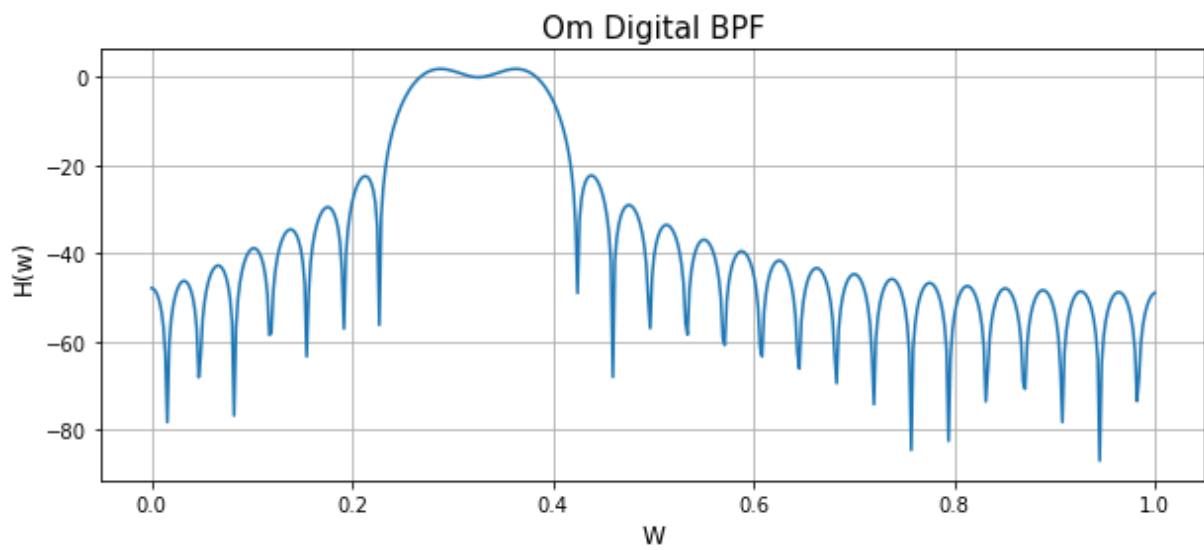Lower cut-off Frequency = 0.25pi & Higher cut-off Frequency = 0.4pi

Length = 51

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

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

```
[-0.01 -0.01  0.    0.03  0.03 -0.   -0.03 -0.03 -0.    0.02  0.02  0.
  0.    0.02  0.01 -0.04 -0.06 -0.03  0.07  0.11  0.05 -0.08 -0.15 -0.07
  0.09  0.17  0.09 -0.07 -0.15 -0.08  0.05  0.11  0.07 -0.03 -0.06 -0.04
  0.01  0.02  0.    0.    0.02  0.02 -0.   -0.03 -0.03 -0.    0.03  0.03
  0.   -0.01 -0.01]
```

In [3]:
```python
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 BPF', fontsize = 15)
plt.xlabel ('W', fontsize = 12)
plt.ylabel ('H(w)', fontsize = 12)
```

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

Om Digital BPF

In [ ]: