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Year of Study: TE
Division: A
Batch: TA-3
Date: 31/08/2023
Time: 14:00

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

Cut-off Frequency = 0.3pi

Length = 51

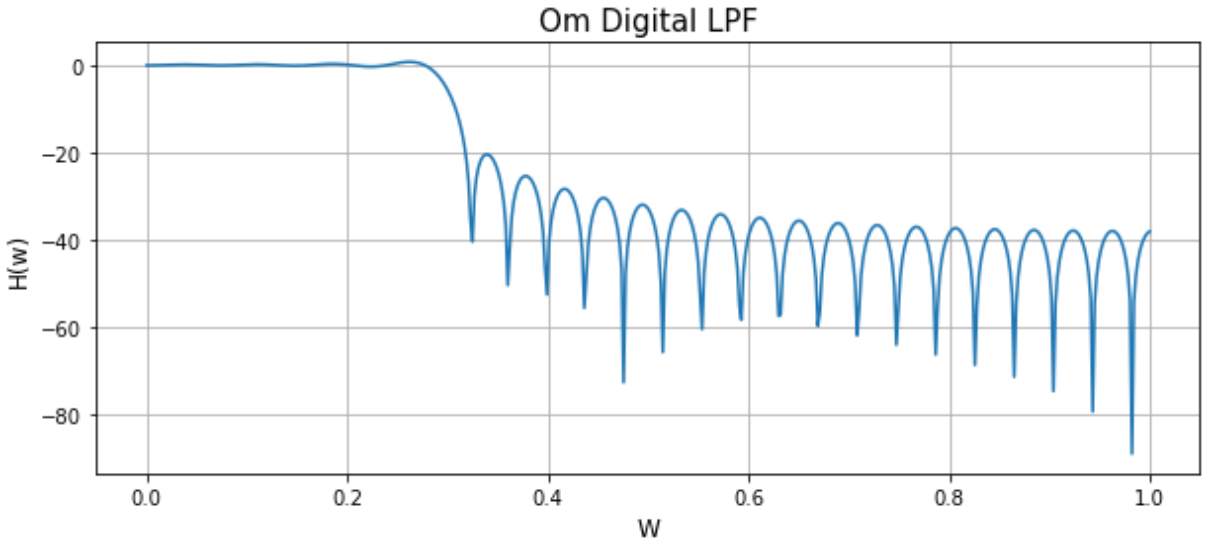
In [1]:
```
# Importing in-built libraries of python
import numpy as np
import matplotlib.pyplot as plt
import scipy.signal as signal
```

In [2]:
```
# Design of FIR LPF using Rectangular Window
N = 51 # Type - I
b = signal.firwin(N, cutoff = 0.3, window = 'rect', pass_zero = True)
a = 1
print(np.round(b, decimals = 2))
```

```
[-0.01 -0.01  0.    0.01  0.01 -0.   -0.01 -0.02 -0.01  0.01  0.02  0.01
 -0.01 -0.03 -0.02  0.    0.03  0.04  0.01 -0.03 -0.06 -0.05  0.03  0.15
  0.26  0.3   0.26  0.15  0.03 -0.05 -0.06 -0.03  0.01  0.04  0.03  0.
 -0.02 -0.03 -0.01  0.01  0.02  0.01 -0.01 -0.02 -0.01 -0.    0.01  0.01
  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 LPF', fontsize = 15)
plt.xlabel ('W', fontsize = 12)
plt.ylabel ('H(w)', fontsize = 12)
```

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



In [ ]: