Table of Contents


```
% LAB6 Checks functionality of FIR window design
%      Place this file in same directory as your
%      rectfilt, hammingfilt and kaiserfilt functions.
```

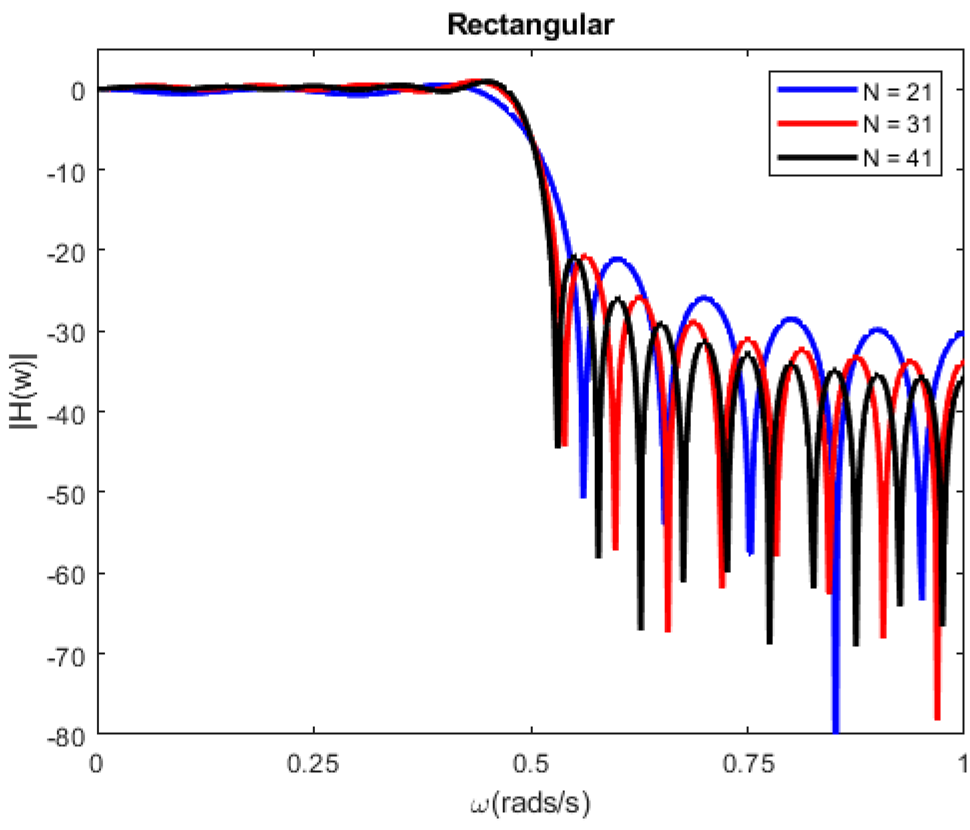
Part 1: Check filter design

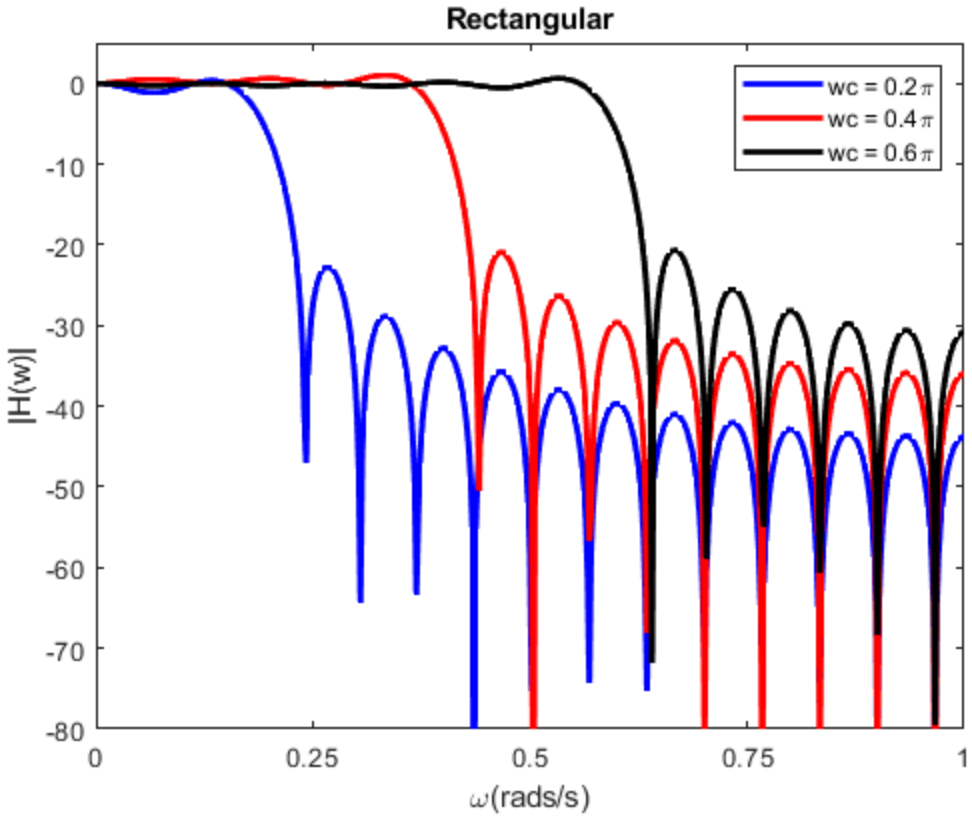
```
test_lab7a

Testing 'rectfilt' with N=21 and wc=0.25: O.K.
Testing 'rectfilt' with N=31 and wc=0.25: O.K.
Testing 'rectfilt' with N=41 and wc=0.25: O.K.
Testing 'rectfilt' with N=21 and wc=0.50: O.K.
Testing 'rectfilt' with N=31 and wc=0.50: O.K.
Testing 'rectfilt' with N=41 and wc=0.50: O.K.
Testing 'rectfilt' with N=21 and wc=0.75: O.K.
Testing 'rectfilt' with N=31 and wc=0.75: O.K.
Testing 'rectfilt' with N=41 and wc=0.75: O.K.

Testing 'hammingfilt' with N=21 and wc=0.25: O.K.
Testing 'hammingfilt' with N=31 and wc=0.25: O.K.
Testing 'hammingfilt' with N=41 and wc=0.25: O.K.
Testing 'hammingfilt' with N=21 and wc=0.50: O.K.
Testing 'hammingfilt' with N=31 and wc=0.50: O.K.
Testing 'hammingfilt' with N=41 and wc=0.50: O.K.
Testing 'hammingfilt' with N=21 and wc=0.75: O.K.
Testing 'hammingfilt' with N=31 and wc=0.75: O.K.
Testing 'hammingfilt' with N=41 and wc=0.75: O.K.

Testing 'kaiserfilt' with deltaOmega=0.1, delta=0.01:
 N (1.750109e+02) is incorrect, beta (3.39532) is incorrect
Testing 'kaiserfilt' with deltaOmega=0.2, delta=0.01:
 N (8.750547e+01) is incorrect, beta (3.39532) is incorrect
```

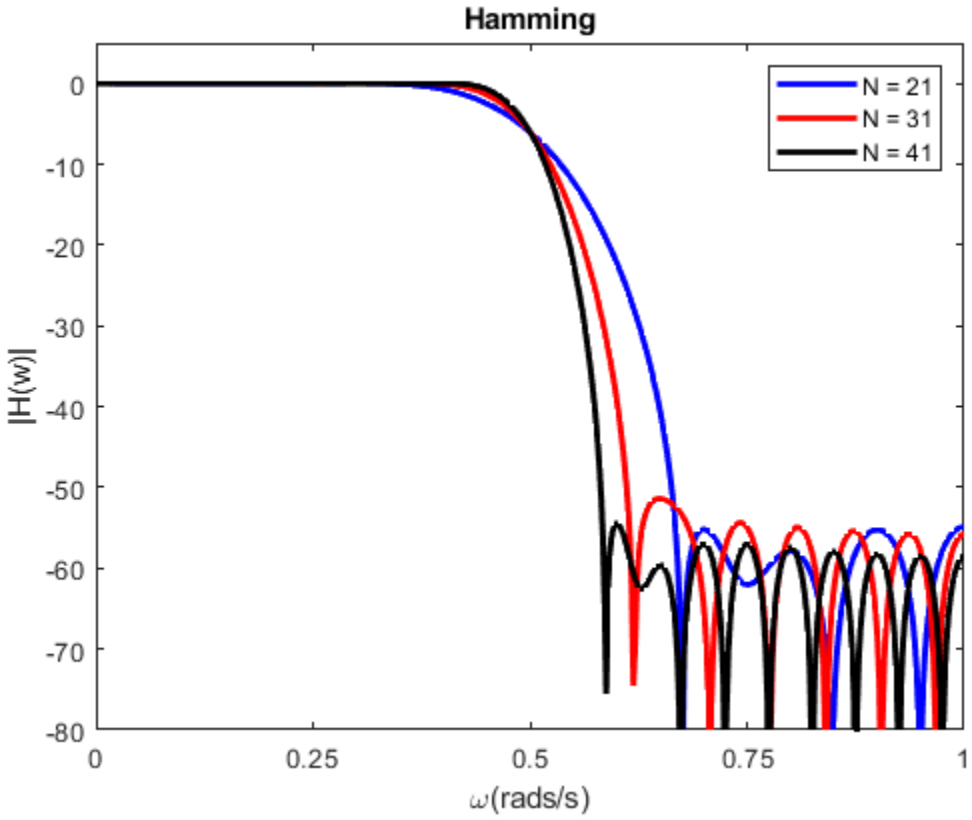
Part II: Comparative behavior of window filters

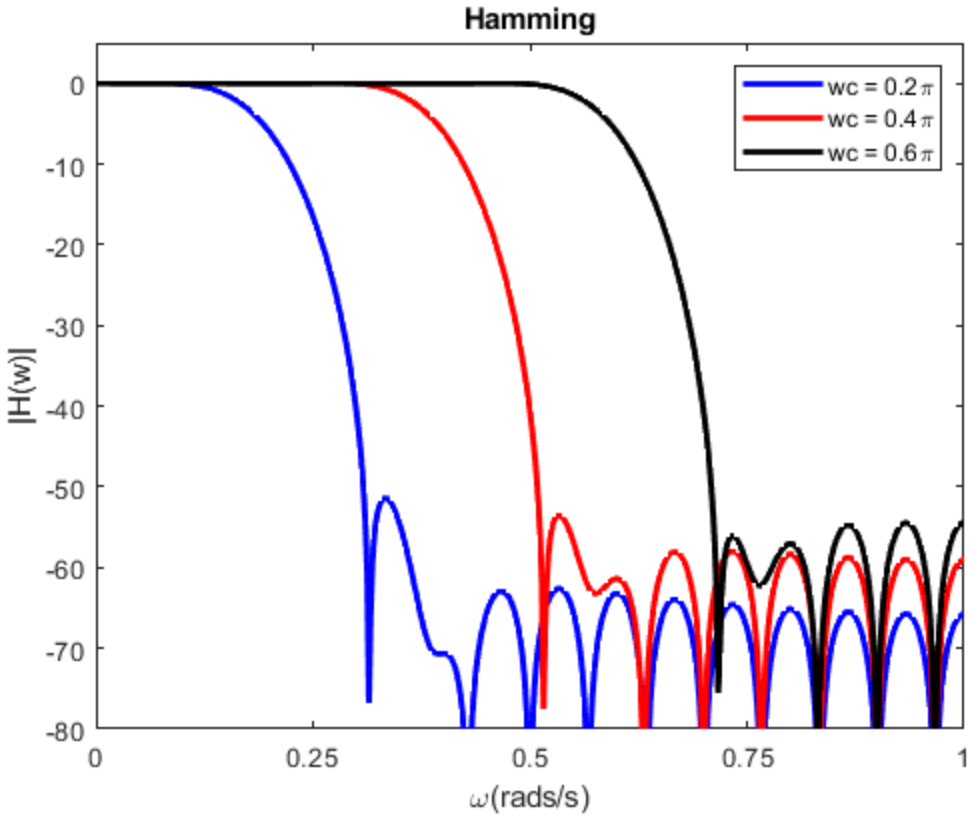
```
test_lab7b

Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
```

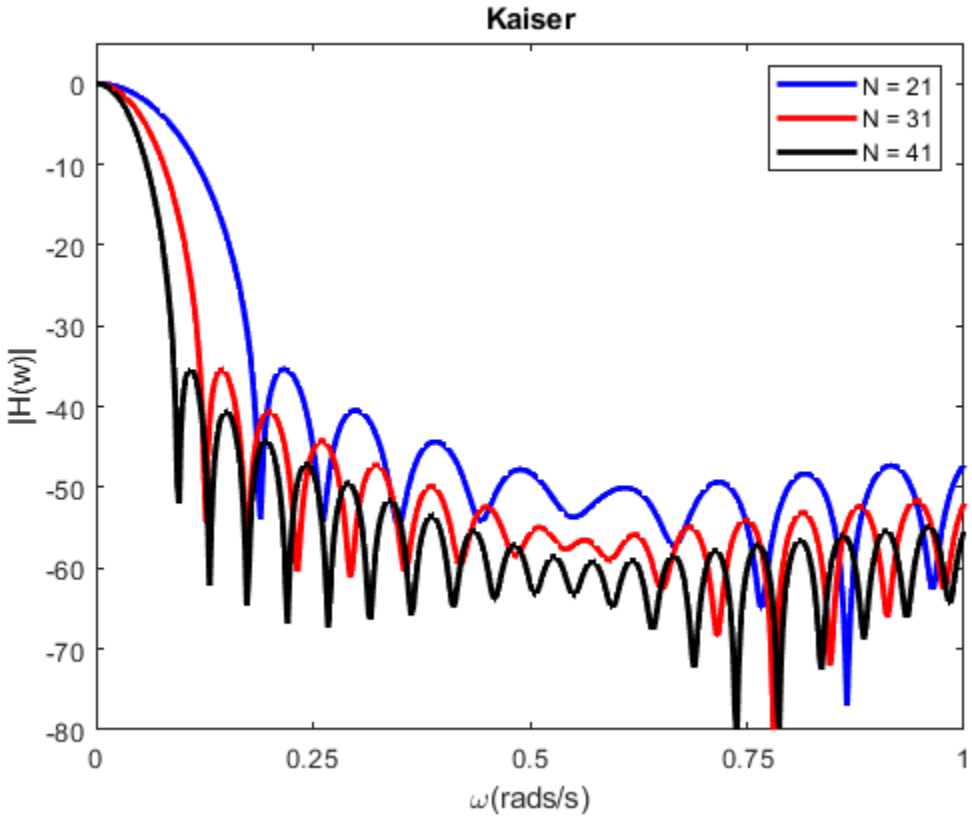
```
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
Warning: Imaginary parts of complex X and/or Y arguments ignored.
```

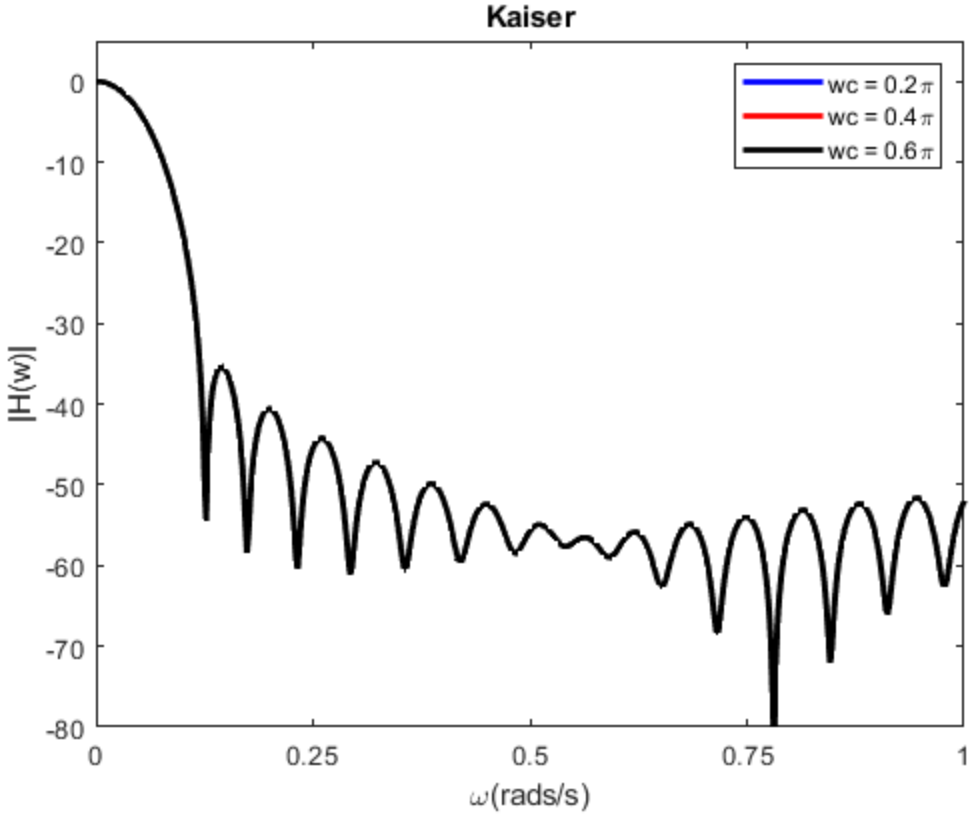


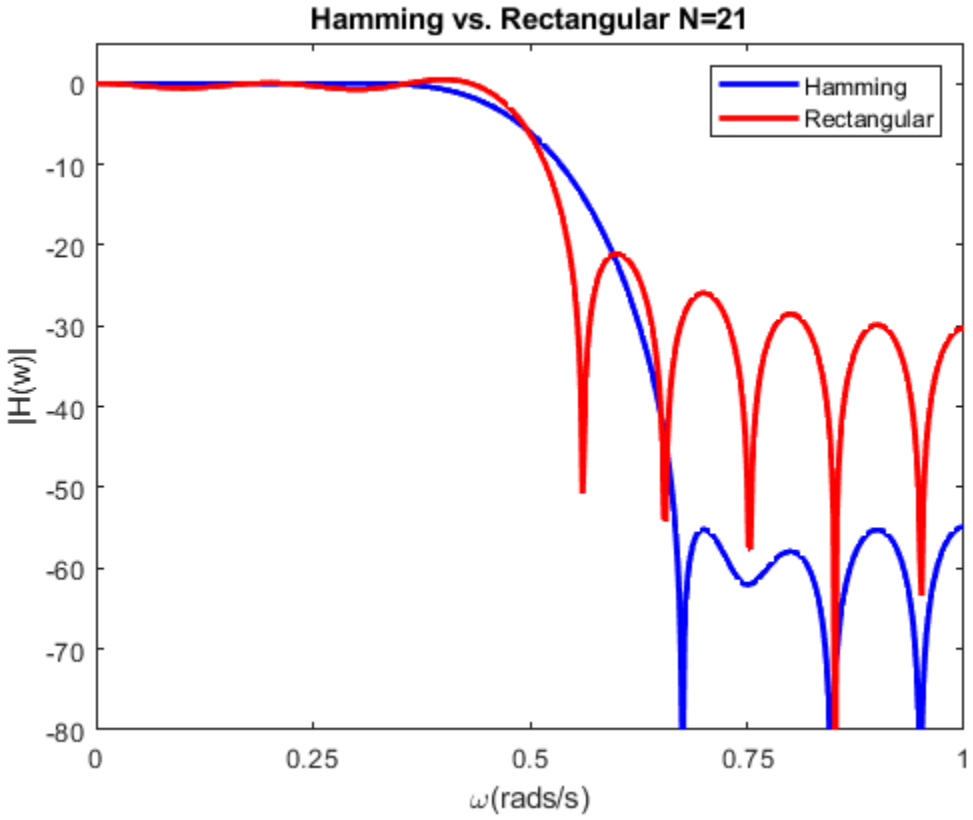

Rectangular
wc = 0.2π
wc = 0.4π
wc = 0.6π
|H(w)|
0
-10
-20
-30
-40
-50
-60
-70
-80
0
0.25
0.5
0.75
1
ω(rads/s)

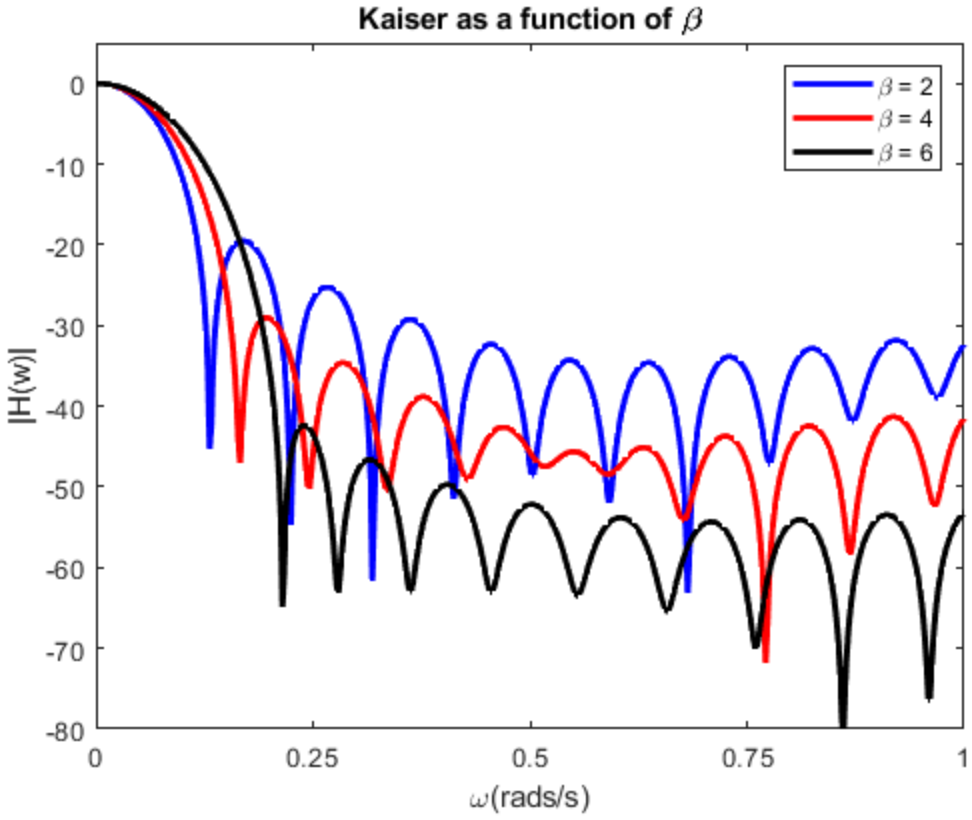

Hamming
N = 21
N = 31
N = 41
|H(w)|
0
-10
-20
-30
-40
-50
-60
-70
-80
0
0.25
0.5
0.75
1
ω(rads/s)

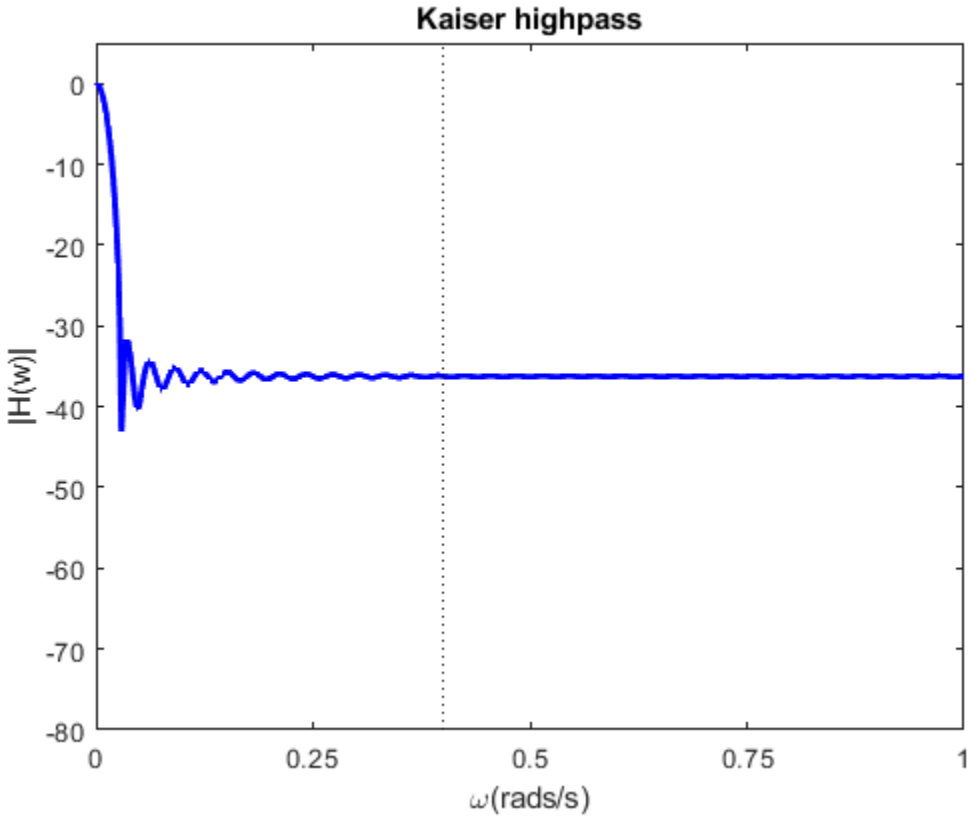

Hamming
wc = 0.2π
wc = 0.4π
wc = 0.6π
0
-10
-20
-30
-40
-50
-60
-70
-80
|H(w)|
0
0.25
0.5
0.75
1
ω(rads/s)


Kaiser
N = 21
N = 31
N = 41
0
-10
-20
-30
-40
-50
-60
-70
-80
|H(w)|
0
0.25
0.5
0.75
1
ω(rads/s)


Kaiser
wc = 0.2π
wc = 0.4π
wc = 0.6π
0
-10
-20
-30
-40
-50
-60
-70
-80
|H(w)|
0
0.25
0.5
0.75
1
ω(rads/s)


Hamming vs. Rectangular N=21
Hamming
Rectangular
0
-10
-20
-30
-40
-50
-60
-70
-80
|H(w)|
0
0.25
0.5
0.75
1
ω(rads/s)


Kaiser as a function of β
β = 2
β = 4
β = 6
0
-10
-20
-30
-40
-50
-60
-70
-80
|H(w)|
0
0.25
0.5
0.75
1
ω(rads/s)


Kaiser highpass
0
-10
-20
-30
-40
-50
-60
-70
-80
|H(w)|
0
0.25
0.5
0.75
1
ω(rads/s)

Part III: Phone tones

```
test_lab7c
```

```
Warning: Order of your highpass filter (I'm guessing 800) may have
 been even
Signal to noise ratio of row tones: -4.9101-0.00042616i
Signal to noise ratio of column tones: -3.0135-0.00023558i
```

Published with MATLAB® R2020b