

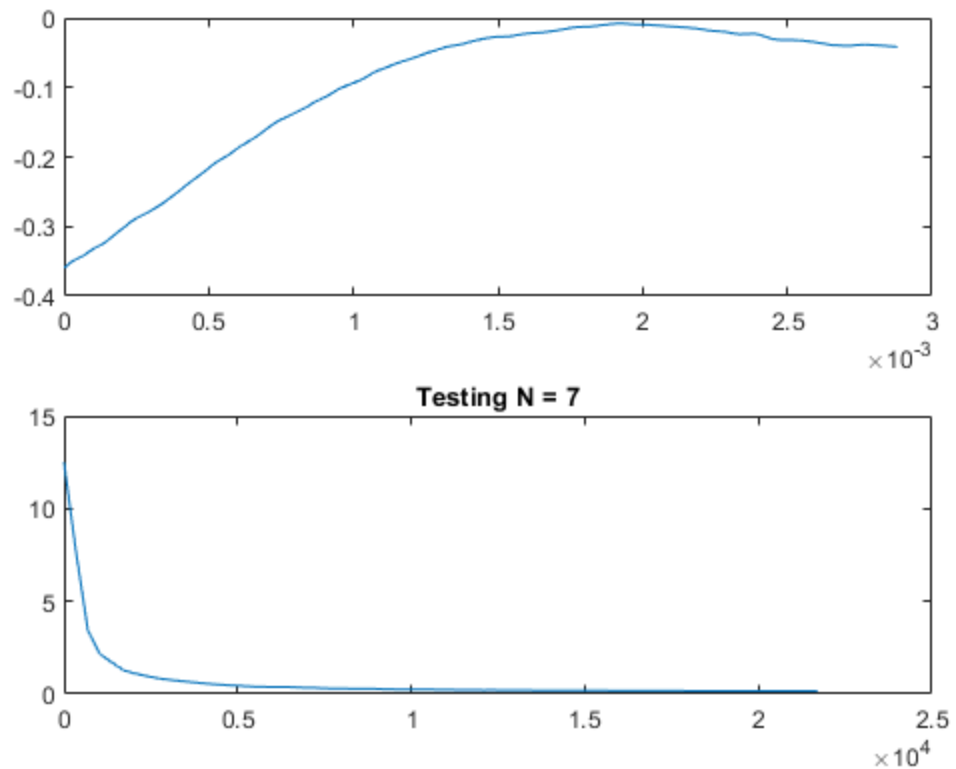
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## Table of Contents

Exercise 7.12, N = 7 .....	1
Exercise 7.12, N = 9 .....	2
Exercise 7.12, N = 14 .....	3
Exercise 7.12, N = 18 .....	4
Exercise 7.12, half the time .....	5
Exercise 7.12, third the time .....	6
Exercise 7.12, fourth the time .....	7

## Exercise 7.12, N = 7

```
filename='gong2.wav' ; % name of wave file goes here
N_values = [2^7, 2^9, 2^12, 2^14, 2^16, 2^18];
[ x , sr ]=audioread( filename ) ; % read in wavefile
Ts=1/ sr ; % sample interval and # of
    samples
N=2^7; x=x(1:N)'; % length for analysis
sound(x , 1 / Ts ) % play sound , if sound card
    installed
time=Ts * ( 0 : length(x)-1); % establish time base for
    plotting
figure
subplot ( 2 , 1 , 1 ) , plot ( time , x ) % and plot top
    figure
magx=abs ( fft(x) ) ; % take FFT magnitude
ssf =(0:N/2-1)/(Ts*N) ; % establish freq base for plotting
subplot( 2 , 1 , 2 ), plot( ssf, magx ( 1:N/2) ) % plot mag spectrum
title('Testing N = 7');
```

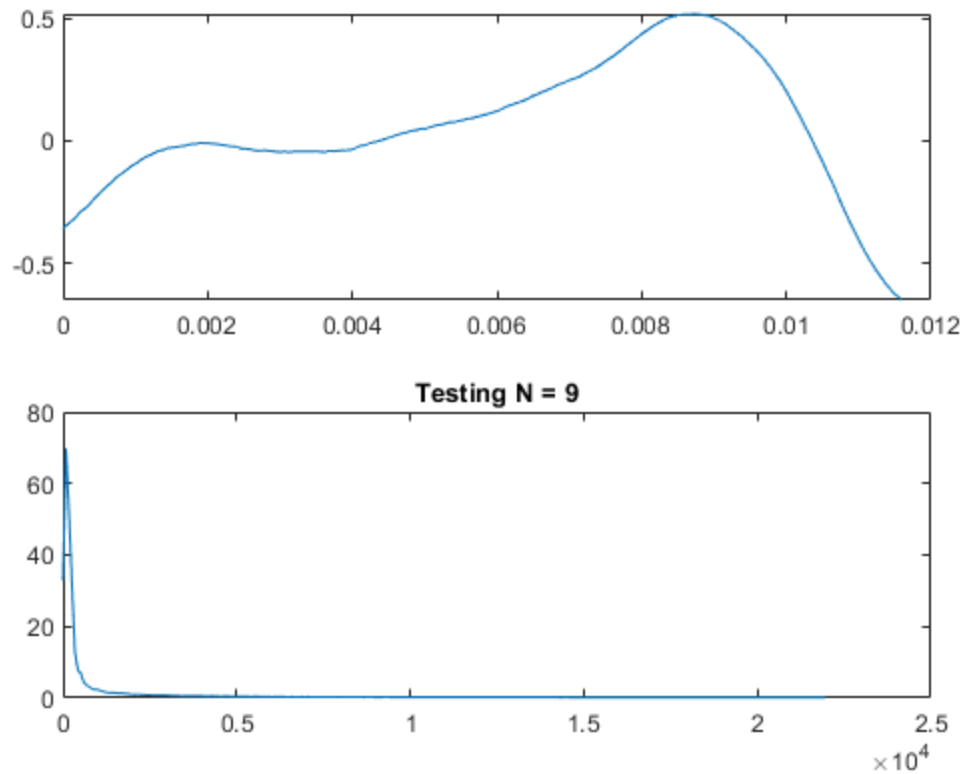


## Exercise 7.12, N = 9

```

filename='gong2.wav' ; % name of wave file goes here
[ x , sr ]=audioread( filename ) ; % read in wavefile
Ts=1/ sr ; % sample interval and # of
samples
N=2^9; x=x(1:N)'; % length for analysis
sound(x , 1 / Ts ) % play sound , if sound card
installed
time=Ts * ( 0 : length(x)-1); % establish time base for
plotting
figure
subplot ( 2 , 1 , 1 ) , plot ( time , x ) % and plot top
figure
magx=abs ( fft(x) ) ; % take FFT magnitude
ssf =(0:N/2-1)/(Ts*N) ; % establish freq base for plotting
subplot( 2 , 1 , 2 ) , plot( ssf, magx ( 1:N/2) ) % plot mag spectrum
title('Testing N = 9')

```

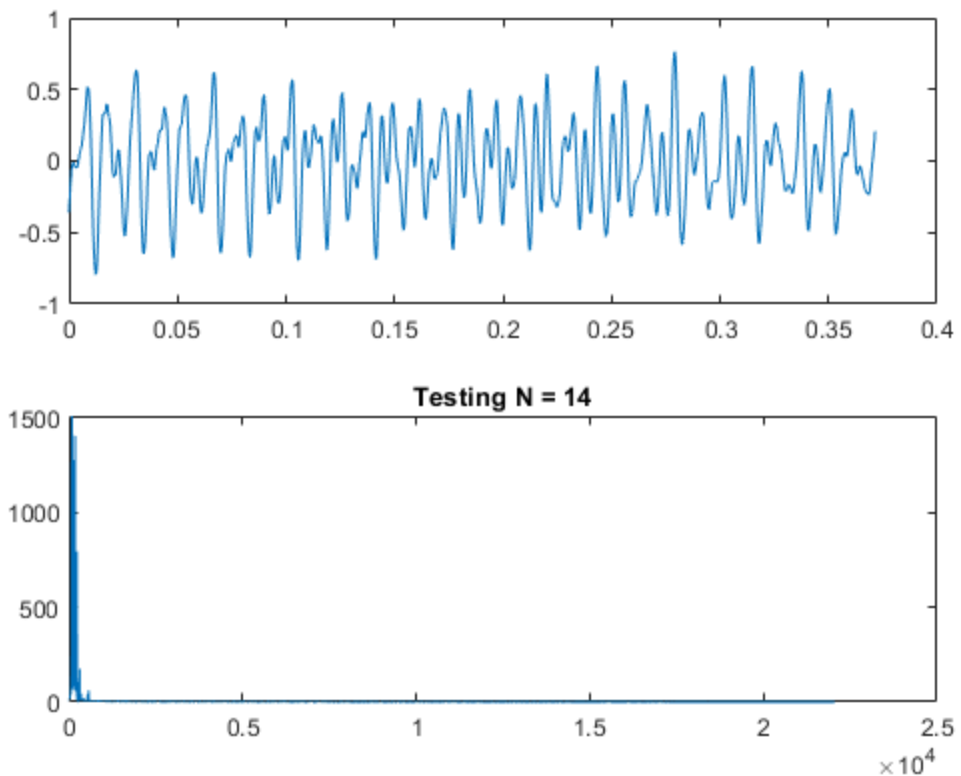


## Exercise 7.12, N = 14

```

filename='gong2.wav' ; % name of wave file goes here
[ x , sr ]=audioread( filename ) ; % read in wavefile
Ts=1/ sr ; % sample interval and # of
samples
N=2^14; x=x(1:N)'; % length for analysis
sound(x , 1 / Ts ) % play sound , if sound card
installed
time=Ts * ( 0 : length(x)-1); % establish time base for
plotting
figure
subplot ( 2 , 1 , 1 ) , plot ( time , x ) % and plot top
figure
magx=abs ( fft(x) ) ; % take FFT magnitude
ssf =(0:N/2-1)/(Ts*N) ; % establish freq base for plotting
subplot( 2 , 1 , 2 ) , plot( ssf, magx ( 1:N/2) ) % plot mag spectrum
title('Testing N = 14')

```

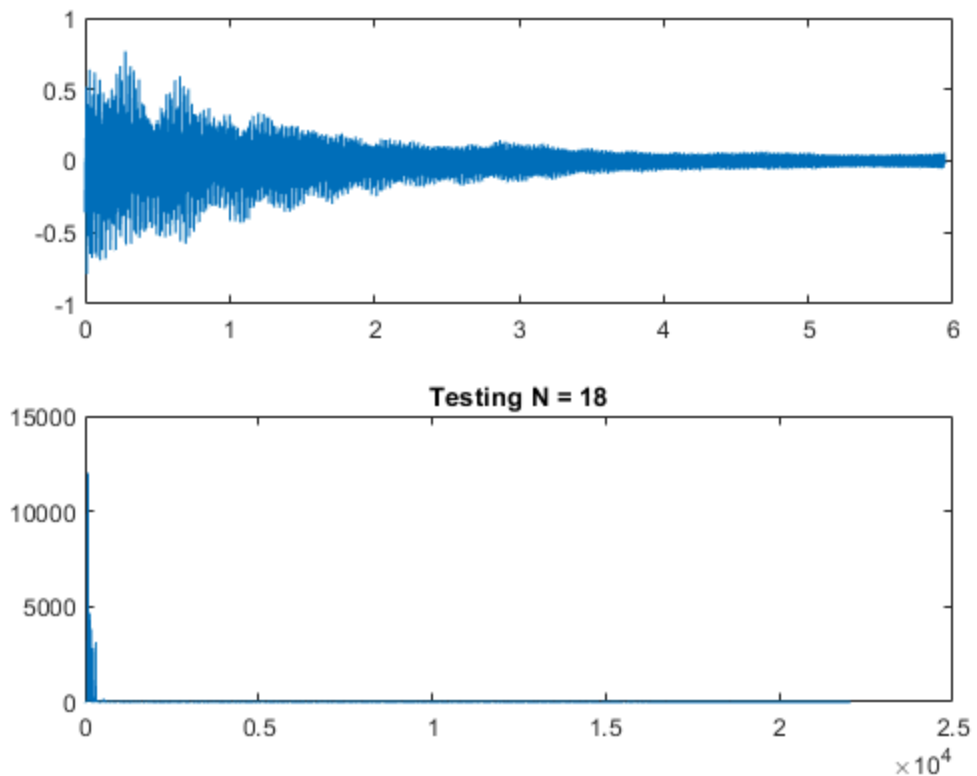


## Exercise 7.12, N = 18

```

filename='gong2.wav' ; % name of wave file goes here
[ x , sr ]=audioread( filename ) ; % read in wavefile
Ts=1/ sr ; % sample interval and # of
samples
N=2^18; x=x(1:N)'; % length for analysis
sound(x , 1 / Ts ) % play sound , if sound card
installed
time=Ts * ( 0 : length(x)-1); % establish time base for
plotting
figure
subplot ( 2 , 1 , 1 ) , plot ( time , x ) % and plot top
figure
magx=abs ( fft(x) ) ; % take FFT magnitude
ssf =(0:N/2-1)/(Ts*N) ; % establish freq base for plotting
subplot( 2 , 1 , 2 ), plot( ssf, magx ( 1:N/2) ) % plot mag spectrum
title('Testing N = 18')

```

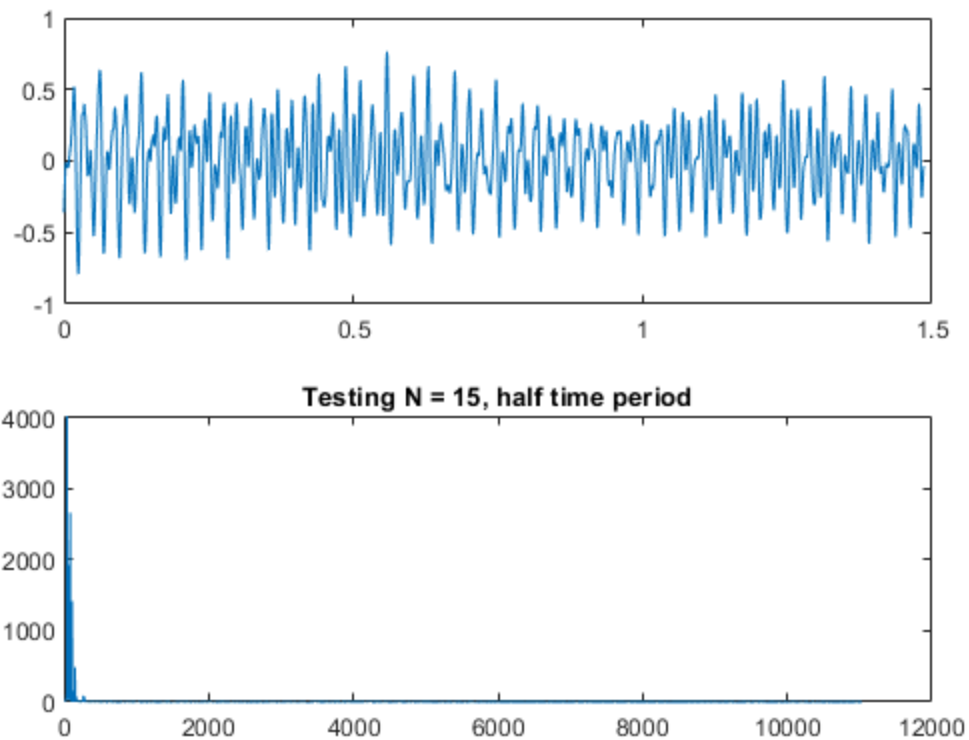


## Exercise 7.12, half the time

```

filename='gong2.wav' ; % name of wave file goes here
[ x , sr ]=audioread( filename ) ; % read in wavefile
Ts=1/ sr *2 ; % sample interval and # of
samples
N=2^15; x=x(1:N)'; % length for analysis
sound(x , 1 / Ts ) % play sound , if sound card
installed
time=Ts * ( 0 : length(x)-1); % establish time base for
plotting
figure
subplot ( 2 , 1 , 1 ) , plot ( time , x ) % and plot top
figure
magx=abs ( fft(x) ) ; % take FFT magnitude
ssf =(0:N/2-1)/(Ts*N) ; % establish freq base for plotting
subplot( 2 , 1 , 2 ), plot( ssf, magx ( 1:N/2) ) % plot mag spectrum
title('Testing N = 15, half time period')

```

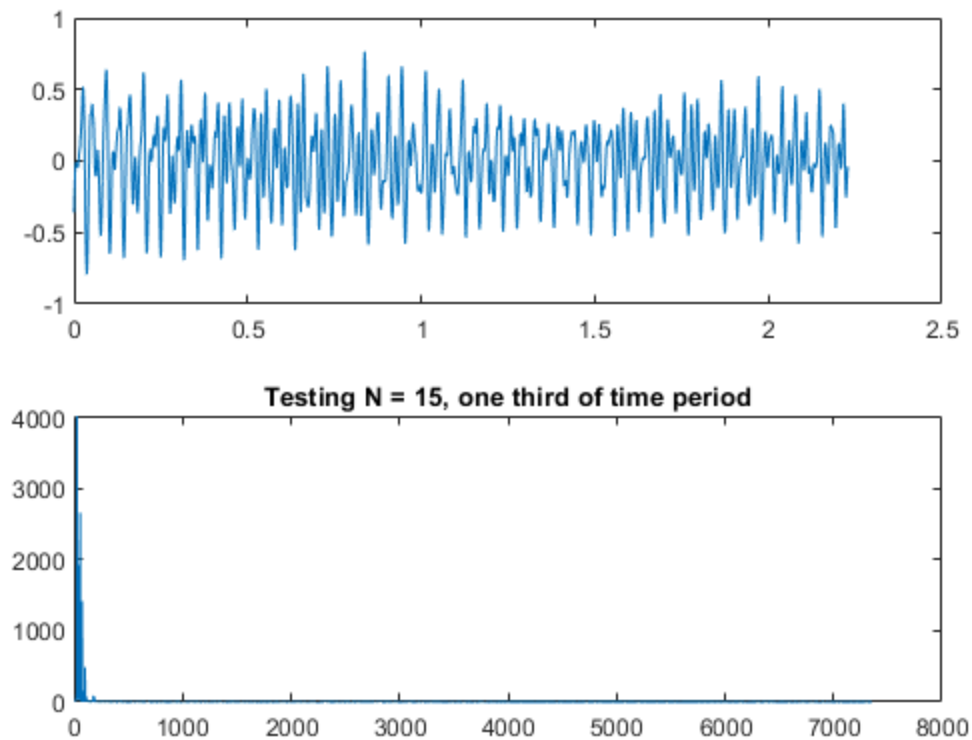


## Exercise 7.12, third the time

```

filename='gong2.wav' ; % name of wave file goes here
[ x , sr ]=audioread( filename ) ; % read in wavefile
Ts=1/ sr *3 ; % sample interval and # of
samples
N=2^15; x=x(1:N)'; % length for analysis
sound(x , 1 / Ts ) % play sound , if sound card
installed
time=Ts * ( 0 : length(x)-1); % establish time base for
plotting
figure
subplot ( 2 , 1 , 1 ) , plot ( time , x ) % and plot top
figure
magx=abs ( fft(x) ) ; % take FFT magnitude
ssf =(0:N/2-1)/(Ts*N) ; % establish freq base for plotting
subplot( 2 , 1 , 2 ) , plot( ssf, magx ( 1:N/2) ) % plot mag spectrum
title('Testing N = 15, one third of time period')

```

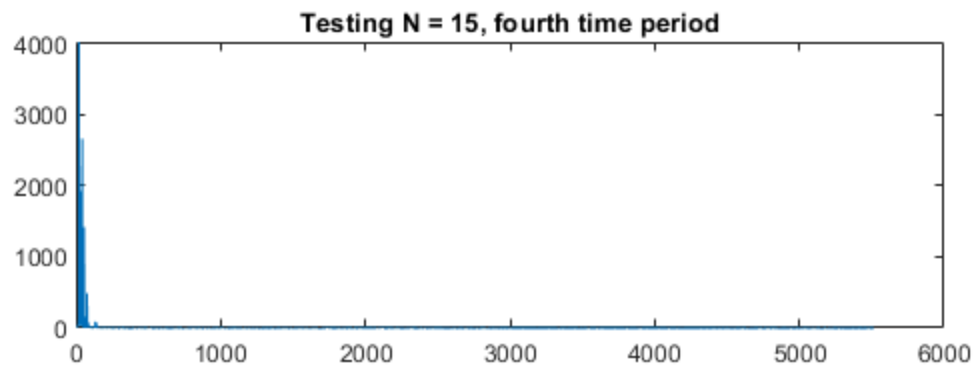
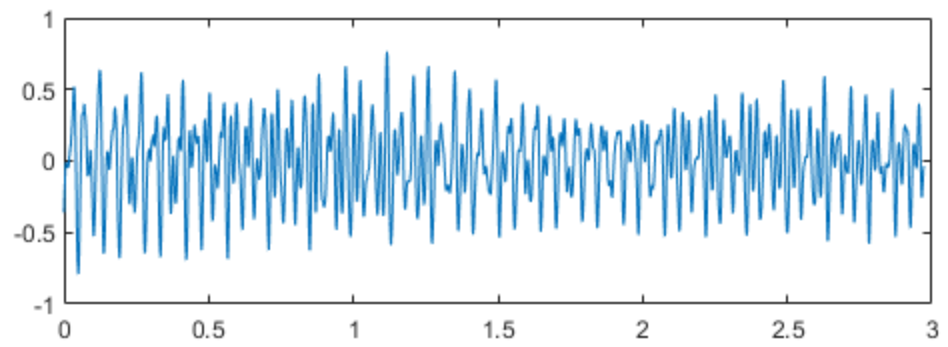


## Exercise 7.12, fourth the time

```

filename='gong2.wav' ; % name of wave file goes here
[ x , sr ]=audioread( filename ) ; % read in wavefile
Ts=1/ sr *4 ; % sample interval and # of
samples
N=2^15; x=x(1:N)'; % length for analysis
sound(x , 1 / Ts ) % play sound , if sound card
installed
time=Ts * ( 0 : length(x)-1); % establish time base for
plotting
figure
subplot ( 2 , 1 , 1 ) , plot ( time , x ) % and plot top
figure
magx=abs ( fft(x) ) ; % take FFT magnitude
ssf =(0:N/2-1)/(Ts*N) ; % establish freq base for plotting
subplot( 2 , 1 , 2 ), plot( ssf, magx ( 1:N/2) ) % plot mag spectrum
title('Testing N = 15, fourth time period')

```



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