HW6

휴먼지능정보공학과 201910803 박채희

A Soft Murmur" is a web site that plays a mixture of natural noise sources, including rain, waves, wind, etc. At http://asoftmurmur.com/about/ you can find their list of recordings, most of which are at http://freesound.org.

Download a few of these files and compute the spectrum of each signal. Does the power spectrum look like white noise, pink noise, or Brownian noise? How does the spectrum vary over time?

In [32]:
```
import numpy as np
import matplotlib.pyplot as plt
import thinkdsp
import thinkplot
from thinkdsp import decorate
```

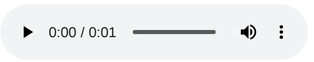
In [33]:
```
from thinkdsp import read_wave

wave = read_wave('202017__ryancacophony__singing-bell-hit-2.wav')
wave.make_audio()
```

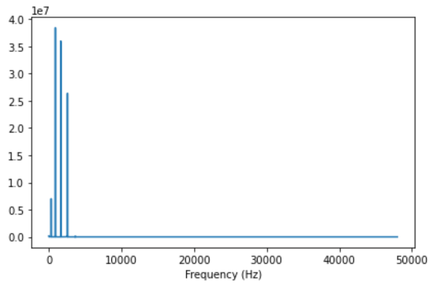
Out[33]:

In [34]:
```
segment = wave.segment(start=0.5, duration=1.0)
segment.make_audio()
```

Out[34]:

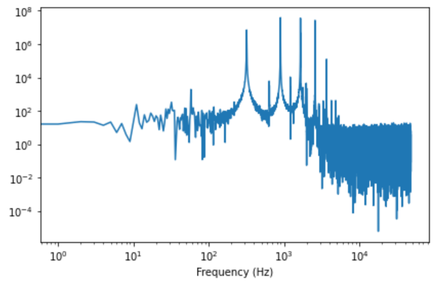


In [35]:
```
#원래 spectrum
spectrum = segment.make_spectrum()
spectrum.plot_power()
decorate(xlabel='Frequency (Hz)')
```



In [36]:
```
spectrum.plot_power()

loglog = dict(xscale='log', yscale='log')
decorate(xlabel='Frequency (Hz)', **loglog)
```

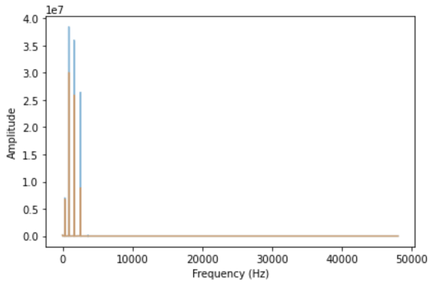


In [49]:
```
segment2 = wave.segment(start=1.5, duration=1.0)
segment2.make_audio()
```

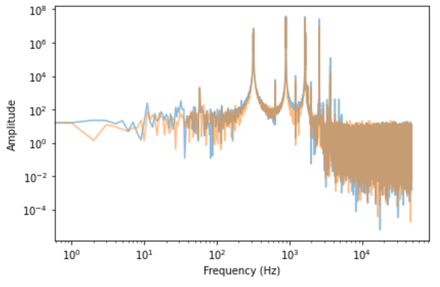
Out[49]:

In [50]:
```
spectrum2 = segment2.make_spectrum()

spectrum.plot_power(alpha=0.5)
spectrum2.plot_power(alpha=0.5)
decorate(xlabel='Frequency (Hz)',
         ylabel='Amplitude')
```



In [51]:
```
spectrum.plot_power(alpha=0.5)
spectrum2.plot_power(alpha=0.5)
decorate(xlabel='Frequency (Hz)',
         ylabel='Amplitude',
         **loglog)
```



두개의 wave segment를 비교해보았고,

주파수가 증가할때, 주파수가 10^3 구간부터 가파르고 거의 linear한 slope가 생성되는 것을 보아 pink나 brownian noise로 보인다.