

Acoustic Beats

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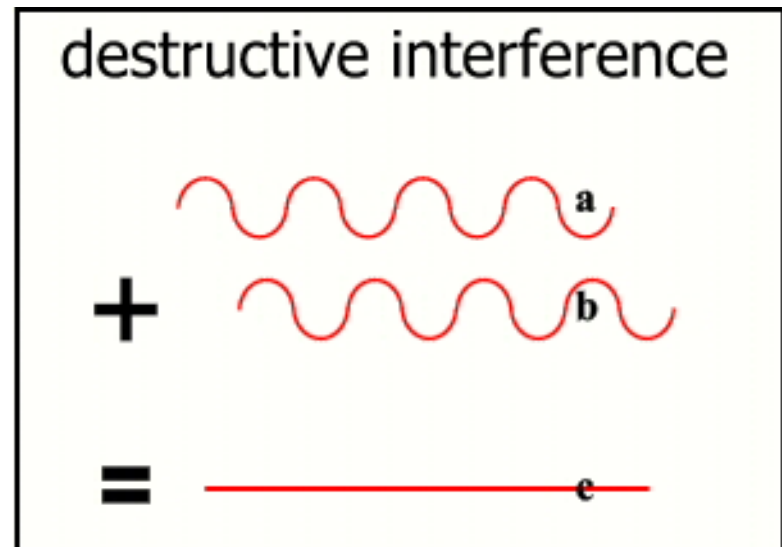
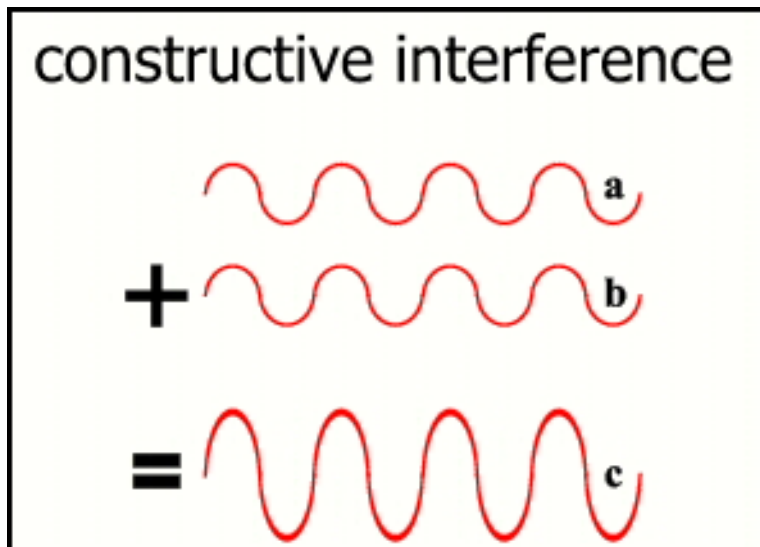
Vibes and Waves in Action

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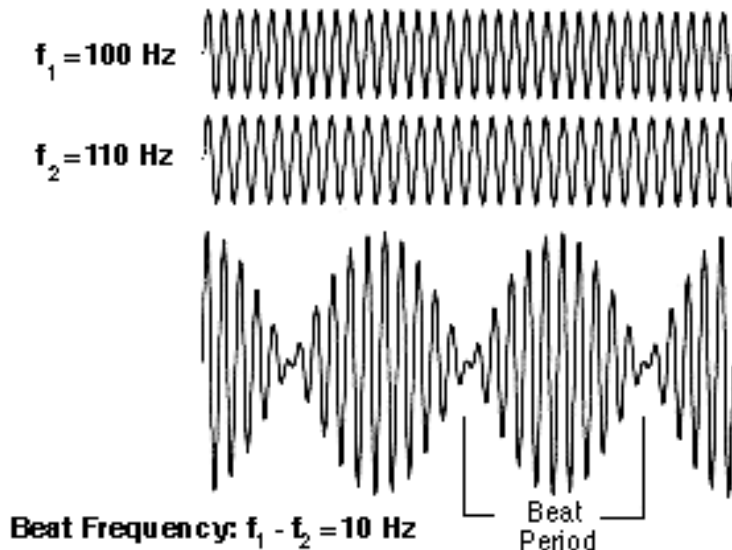
Interference of Waves

- Interference is the addition of two or more waves that results in a new pattern.



Acoustic Beats

- If two sound waves have slightly different frequencies, 15 Hz or less, interference will result from their similar yet not exactly identical frequencies.



When they move out of phase, destructive interference results, decreasing the amplitude.

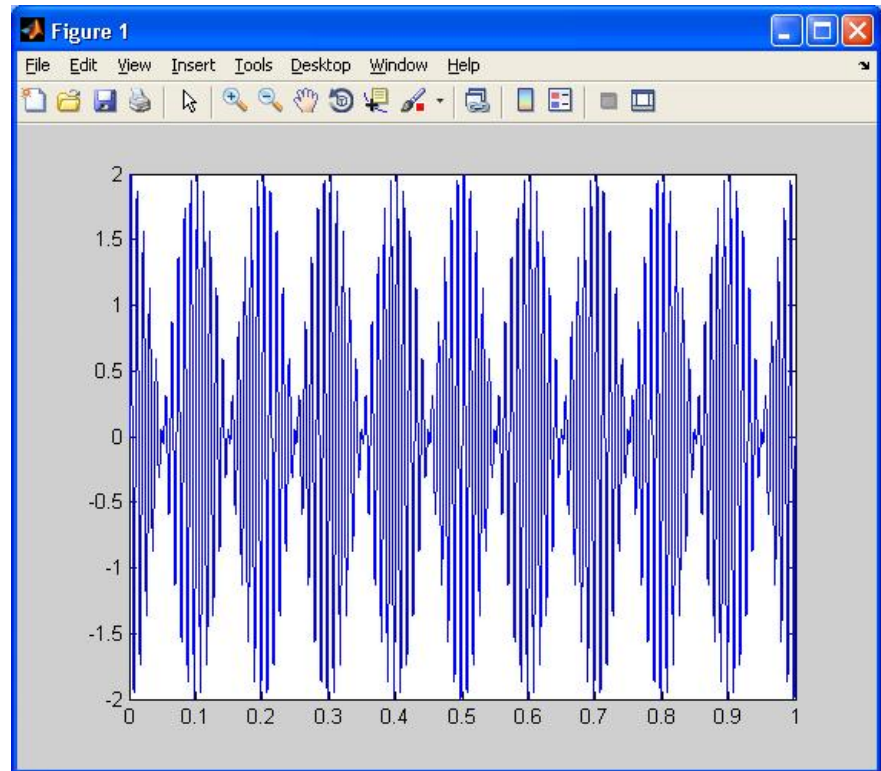
When they move back into phase, constructive interference will increase the amplitude.

Beats are a form of **AMPLITUDE MODULATION**.



Matlab

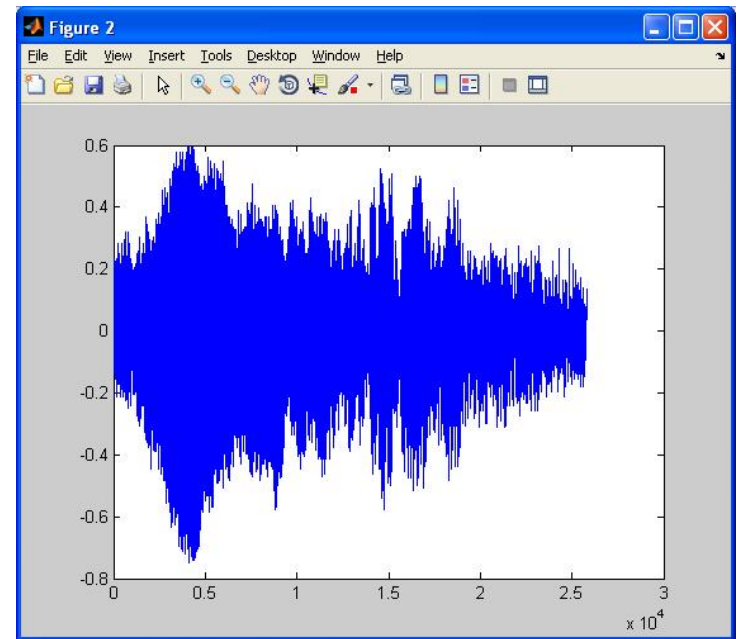
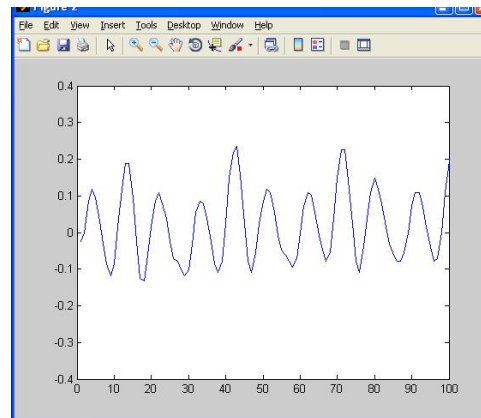
- $fs=8192;$ *sampling rate*
- $dt=1/fs;$ *time intervals per sample*
- $t=[0:dt:1];$ *time array*
- $A1=1;$ *amplitude of sound*
- $f1=100;$ *frequency of sound*
- $y1=A1*\sin(2*pi*f1*t);$ *first sound wave*
- $A2=1;$
- $F2=110;$
- $y2=A2*\sin(2*pi*f2*t);$ *second sound wave*

- `ysum=y1+y2;`
- `plot(t,ysum);`
- `sound(ysum,fs)`



Working with Sound Files

- Change directory to Q:\Kalkan-Savoy, A\sound
- `[y, fs]=wavread('whale.wav');`
- `plot(y);` 
- `axis([0 100 -0.4 0.4]);` 
- `sound(y, fs);`



Working with Data Files

- .mat files: special format data files.
- load tag *to load tag.mat*
- sound(tag, 8000)
- plot(tag)
- axis([5000 5500 -1 1])

