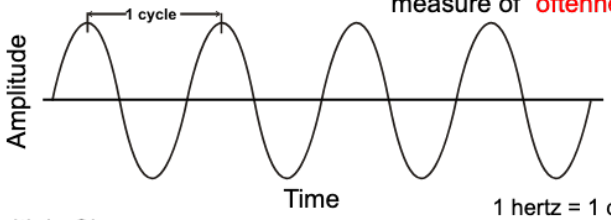
The Time Domain

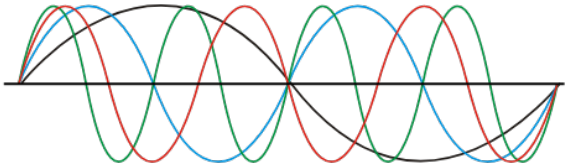
The Sine Wave

Frequency is a measure of "oftenness"

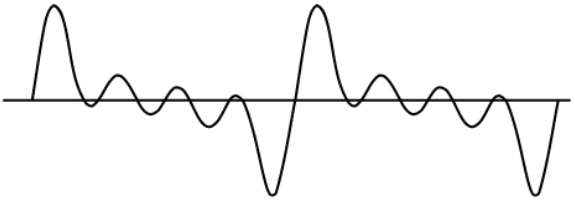


1 hertz = 1 cycle/sec

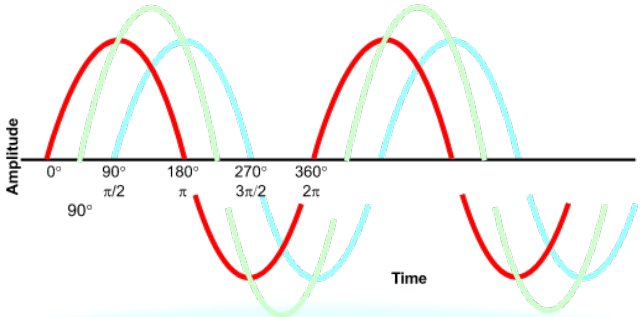
Multiple Sines



Superposition



Relative Phase



The phase angle between two signal of the *same* frequency affects their combined level.
The phase angle between two signal of *different* frequencies affects the wave shape.

Important Relationships

$$TF = 1$$

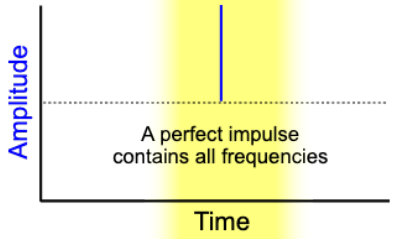
$$T = \frac{1}{F}$$

$$F = \frac{1}{T}$$

$$\lambda = Tc$$

T is Time in seconds
F is Frequency in hertz
c is the speed of sound
λ is the acoustic wavelength

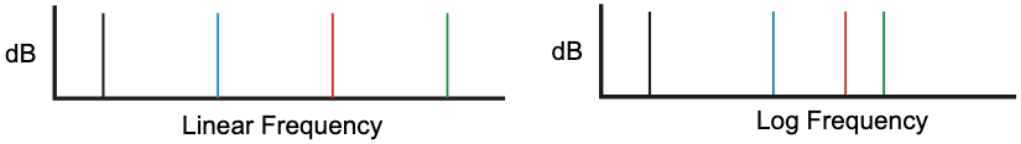
System Measurements

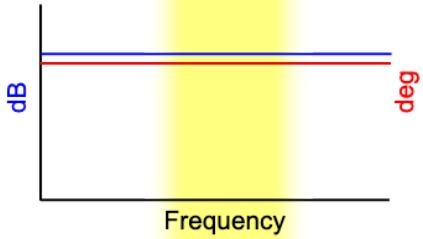


Fourier Transform

The Frequency Domain

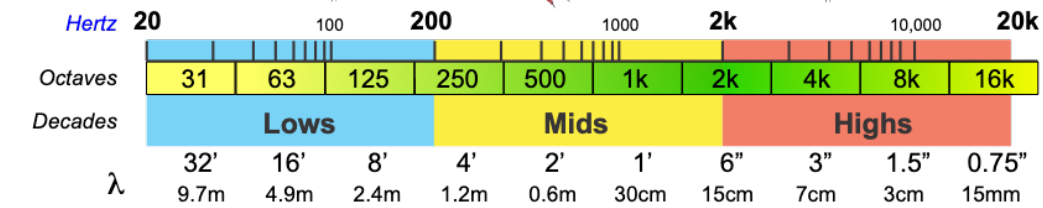
Spectrum



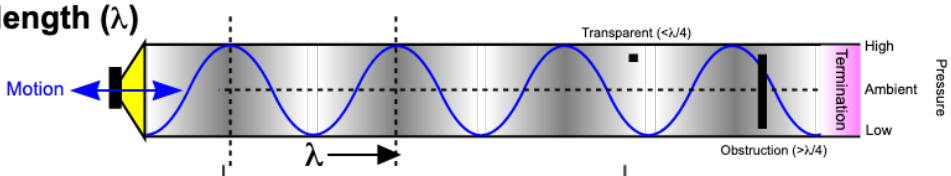


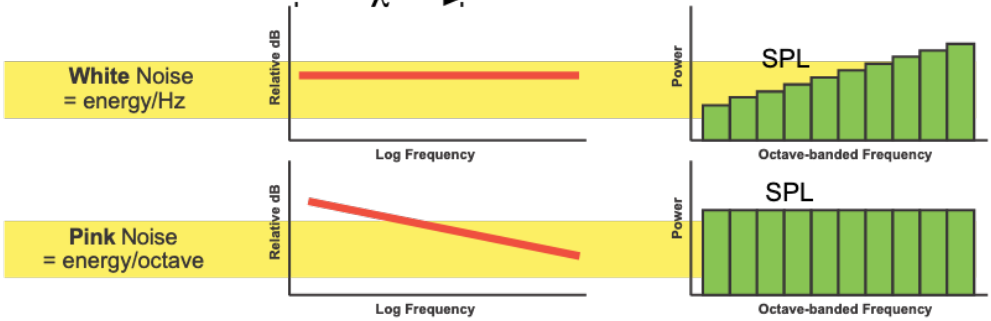
Magnitude
Phase

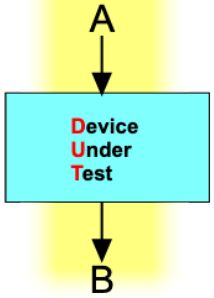
Frequency (Hz)



Wavelength (λ)







B/A = Impulse Response (time)
B/A = Transfer Function (frequency)