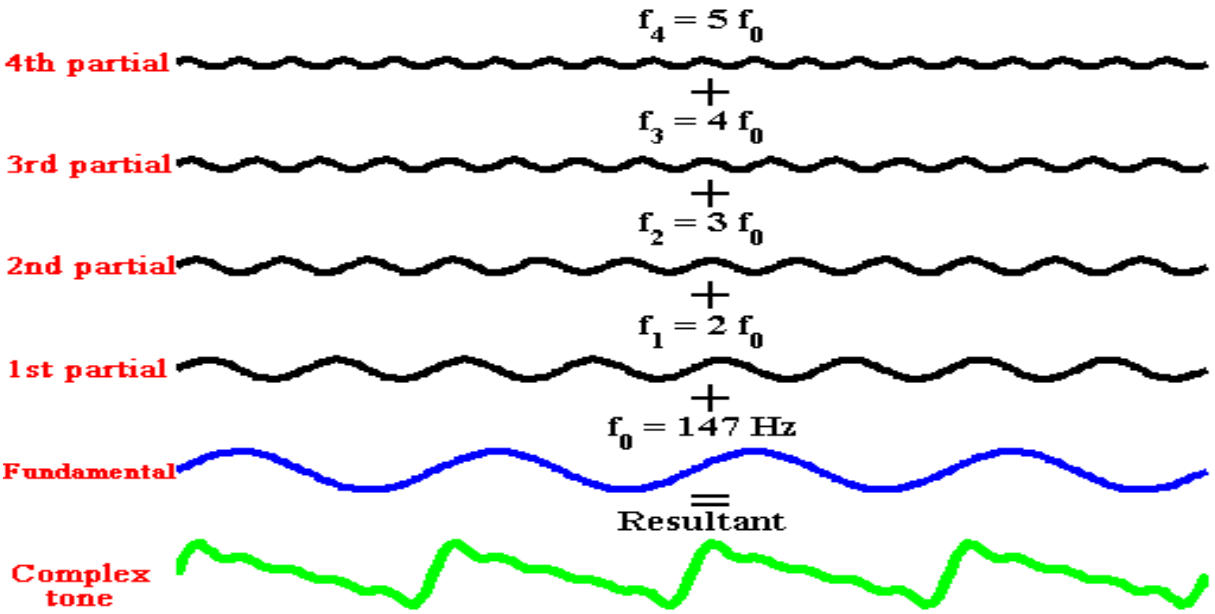
Harmonics

What are harmonics?



It is typically applied to repeating signals, such as sinusoidal waves. A harmonic of such a wave is a wave with a frequency that is a positive integer multiple of the frequency of the original wave, known as the fundamental frequency. The original wave is also called the 1st harmonic, the following harmonics are known as higher harmonics.

Even Harmonics

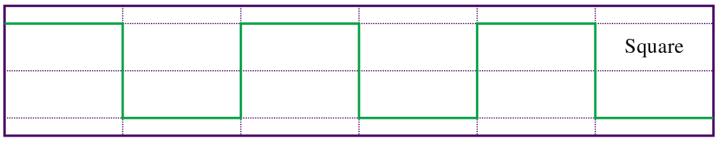
2f (Second), 4f (Fourth), 6f (Sixth) etc

Odd Harmonics:

3f (Third), 5f (Fifth), 7f (Seventh) etc.

Calculation of harmonics on the different sound waves

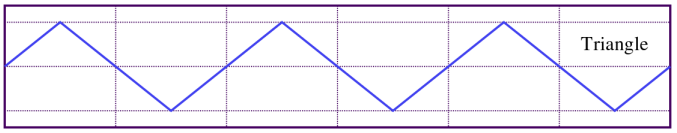
Square Wave



Fundamental + All Odd Harmonics

Frequency	100 Hz	300 Hz	500 Hz
Amplitude	1000 V	333 V	200 V
	1	1/3	1/5

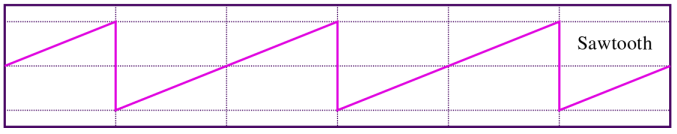
Triangle Wave



Fundamental + All Odd Harmonics
(!!Amplitude sinks faster!!)

Frequency	100 Hz	300 Hz	500 Hz
Amplitude	1000 V	111.12 V	40 V
	1	$1/3^2$	$1/5^2$

Sawtooth Wave



Fundamental + All Harmonics

Frequency	100 HZ	200 Hz	300 Hz	400 Hz	500 Hz
Amplitude	1000 V	500 V	333.34 V	250 V	200 V

Multiplier	1	1/2	1/3	1/4	1/5
Harmonics	f1	f2	f3	f4	f5

Partials

The partials are harmonics that are directly or not directly related to the fundamentals. They are a form of harmonics but not all harmonics are partials

Octaves

Octave is the musical related term to describe the logarithmic relationship with the fundamental frequency