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General Theory - Electronic Tutorials

Harmonics Tutorial

When the same note, say middle C, is played on different instruments, the musical notes produced sound different. This is because that as well as producing the **FUNDAMENTAL FREQUENCY** of middle C they also produce multiples of this frequency called **HARMONICS**.

The fundamental is a pure sine wave.
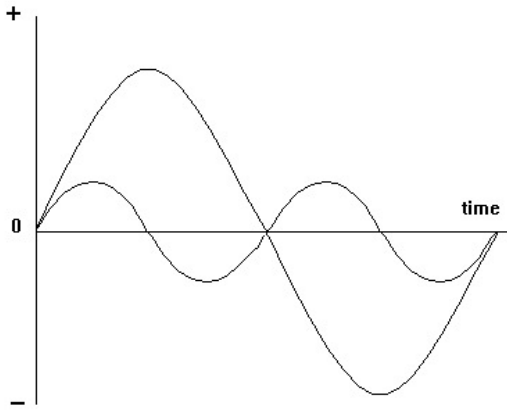
The number and amplitude of the harmonics determines the characteristic sound of the instrument.
The harmonic which is twice the fundamental frequency, as in the diagram, is called the 2nd harmonic.

The frequency which is three times the fundamental is the 3rd harmonic.

The 3rd, 5th, 7th etc are called ODD harmonics.

The 2nd, 4th, 6th, 8th etc are called EVEN harmonics.

A square wave is made up from a fundamental frequency sine wave and an infinite number of odd harmonics.

A sawtooth wave form consists of a fundamental plus an infinite number of even harmonics.

If a sine wave is injected into an amplifier the output wave form may be distorted. This may be due to harmonics being generated by the amplifier.

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