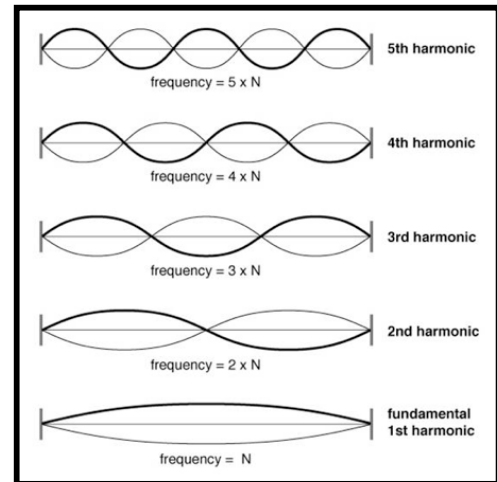


Tonal Theory

The Harmonic Series (up to the 5th partial)

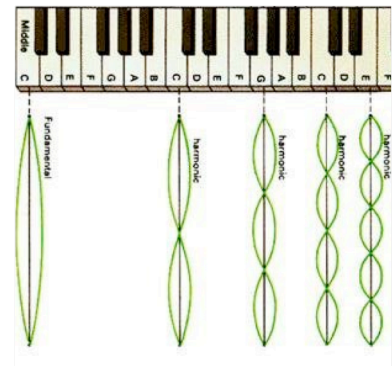
When you divide a string that sounds at frequency n into x equal parts the resulting harmonic sounds at frequency $X \cdot N$.

The first 5 harmonics give the following intervals: **unison**, **octave**, **perfect fifth** (plus an octave), **octave** (plus an octave), **major third** (plus two octaves). It is worth noting that these intervals are given from the perspective of scale degrees (unison, second, third, fourth, fifth, sixth, seventh, octave) and that this terminology is predicated on a 7-note scale and comes from our Western music heritage.



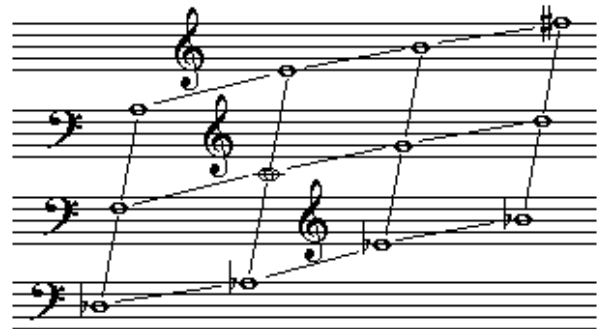
Operative Principle (according to W. A. Mathieu)

“Harmony consists of perfect fifths, major thirds, their compounds, *and their reciprocals* [ala our derivation of “ma” or F in the key of C]. That is different from saying that all notes in music are overtones—such a claim could not be made. **The truth is that the overtone series encodes the secret of all tonal harmony.**” This can be rephrased: “There are two harmonic elements, fifths and thirds, subject to two procedures, above and below.”



The 5-Limit Lattice

This lattice is often referred to as “5-limit” because it is limited to intervals only found within the first 5 partials. The lattice has two axes: horizontal refers to spines of fifths and vertical refers to spines of 3rds.



Important Terms (definitions from Mathieu, Merriam-Webster and Harrist):

Fundamental – the principal/generating musical tone produced by a vibration

Overtone/Harmonic – the tones arising from an oscillating string (or other body) owing to its natural division into parts or segments

Partial – a generating tone or one of its harmonics

Just Intonation – any system of tuning using low prime ratios

Equal Temperament – a system of tuning wherein the octave is divided into intervals of exactly equal size; twelve-tone equal temperament is the standard system of the West.

Modality – the quality of music within a mode. Most simply, the term refers to music that establishes clear choices of tones that relate to an unchanging tonic.