|  |  |  |
| --- | --- | --- |
| 12-tet | 9 | 12-tone equal temperament system. This is the most widely and commonly used tuning system in Western music. The system divides the octave into twelve equal spaces of 100 cents between the half-tones. |
| 53-tet | 4 | Tone system dividing the octave into 53 equal steps. It had first been described by Chinese theorist Jing Fang (78-37 BC) and later by Nicholas Mercator (1620-1687), Isaac Newton (1643-1727) and William Holder (1616-1698). This tuning system approximates the Pythagorean fifth and the just major third. |
| 58-tet | 1 | Tone system dividing the octave into 58 equal steps |
| 59-tet | 1 | Tone system dividing the octave into 59 equal steps |
| Aristoxenus | 1 | Aristoxenos of Tarent, Greek mathematician and music theorist (ca. 360-300 B.C.). Greatly influenced terminology in music theory with many terms still used today. In his writings, he advocated an empirical approach in music theory, drawing strongly on listening. |
| arithmetic mean | 1 | Generally a mean value calculated by dividing the sum of all the numbers in a collection by the number of numbers. |
| ars nova | 1 | The term Ars nova originally relates to the new compositional possibilities afforded by notational innovations described by composer Philippe de Vitry (1291-1361) in his treatise *Ars nova* of 1322. While Ars nova music in this sense is best exemplified by repertoire such as the motets of the *Roman de Fauvel*, the use of the term has gradually been generalized to mean polyphonic music of the 14th century. |
| ars subtilior | 1 | Compositional style of the late 14th century, rhythmically and melodically often highly refined with complex, florid textures. |
| artificial comma | 1 | The small step equal to 1/53 of an octave (22,6415 cents). |
| Bis Diatessaron | 1 | Interval of a double fourth, i.e. minor seventh. |
| bisection of musical intervals | 2 | Dividing an interval in two equal halves. The ratio of the halved interval is the square root of the ratio of the given interval, usually an irrational value. It is impossible to divide an interval of a superparticular ratio, as 3:2 or 5:4, into equal parts with a rational ratio. |
| Boethius | 1 | Late Roman statesman and philosopher (480-524 A.D.). His work *De institutione musica* (with its classification of music in “musica mundana”, “musica humana” and “musica instrumentalis”) became highly influential in the Middle Ages after having been all but forgotten until the ninth century. |
| chords | 1 | A chord (from “accord”) is a set of tones sounding simultaneously. |
| chroma | 1 | Humans perceive pitches to have a similar tone “colour” when the space between them is one or more octaves. This perceived pitch property is referred to as *chroma* (in German: *Tonigkeit*). |
| chromatic genus | 1 | In ancient Greek theory, one of the three tetrachord *genera* (half-tone/half-tone/minor third). |
| chromatic scale | 5 |  |
| chromatic tetrachord | 1 | In ancient Greek theory, one of the three tetrachord *genera* (half-tone/half-tone/minor third). |
| church modes | 2 |  |
| circle of fifths | 1 | The circle of fifths is a visualization of the twelve tones in equal temperament, arranged around a circle with a space of a perfect fifth between the tones. Usually, parallel major and minor keys are indicated (e.g. a/C; G/e, etc.). In Western tonal music, one of its uses is to visualize harmonic relationships and modulations. |
| circular pitch diagram | 9 |  |
| colour spectrum | 4 | Range of light wavelengths visible to the human eye, typically between approx. 390 to 700 nm. The spectrum does not include any mixed colours, but only those with one component. These are called spectral or pure colours. The term was first used by Isaac Newton in 1671. |
| combinations | 1 |  |
| combinatorics | 3 |  |
| concentric circles | 2 |  |
| consonance | 7 |  |
| consonant chords | 1 |  |
| continuous proportion | 9 | http://www.emathzone.com/tutorials/everyday-math/continued-proportion.html |
| coordinate system | 2 | https://en.wikipedia.org/wiki/Coordinate\_system |
| diagram | 1 | Stemming from the Greek *diágramma* (geometrical figure, outline), a diagram is used to graphically convey information, data, mathematical content etc. The graphical representation used in diagrams can take on many forms; for example, it can be conceived strongly metaphorical or more directly related to the information they convey. |
| Diagramatology | 1 | The study of diagrams, their functions and their role in conveying knowledge. (s. https://en.wikipedia.org/wiki/Diagrammatology) |
| Diaschisma | 1 | Interval of approx. 19,5 cent that equals the difference between three octaves and four perfect fifths plus two major thirds in pure intonation. |
| Diatessaron | 1 | The interval of a fourth |
| diatonic scale | 11 | The diatonic scale includes five whole and two half steps in an octave. The half steps are separated by either two or three whole steps. |
| dissonance | 1 | The sounding together of non-consonant intervals. In Pythagorean theory, any ratio composed of numbers greater than four was considered a dissonance. In polyphonic writing, specific rules for preparation and resolution govern the use of dissonances. Definitions and uses of dissonances changed over time and through different musical styles. |
| dissonant chords | 1 |  |
| double cone | 4 | https://en.wikipedia.org/wiki/Cone#Other\_mathematical\_meanings |
| duration | 2 | Time span, duration of any musical unit such as a pitch, a rest, a sequence or a whole piece of music. |
| equilateral triangle | 1 | Triangle with three equal sides. |
| Euclid's altitude theorem | 2 | The altitude theorem states that in a right triangle, the altitude on the hypotenuse corresponds to the -> geometric mean of the two segments into which it divides the hypotenuse. |
| Farbenlehre | 1 | Systems of colour classification and theory |
| figurate numbers | 1 | http://oeis.org/wiki/Figurate\_numbers |
| four elements | 3 | The Greek philosopher Empedocles (490-430 B.C.) defined Fire, Air, Water and Earth as the four “root” elements. |
| geometric mean | 1 | https://en.wikipedia.org/wiki/Geometric\_mean |
| geometric progression | 3 | A number sequence in which each number is followed by the result of the multiplication of that number with a fixed number (not 0). The fixed number is called common ratio. |
| Glareanus | 1 | Swiss music theorist (1488-1563). He is above all noted for his work *Dodecachordon* (published in 1547) in which he presented a theory of twelve tonal modes. |
| Greek tetrachords | 4 | “Four-tone”. A pitch system contained within a perfect fourth. In ancient Greek theory, the three *genera* are determined by the spacing of the notes; diatonic (half-tone/whole-tone/whole-tone), chromatic (half-tone/half-tone/minor third) and enharmonic (quarter-tone/quarter-tone/major third). In modern theory and teaching, tetrachords are often used to point out the structure of major, minor and modal scales within the octave. |
| Greek tonoi | 3 |  |
| harmonic mean | 1 |  |
| harmonics | 2 | Harmonics are composite frequencies of a sound that are integer multiples of its fundamental pitch. On some instruments it is possible to produce harmonics without having the fundamental sound, an effect often used on stringed instruments in instrumental music. |
| harmony of the spheres | 3 |  |
| helix | 2 |  |
| hexachord | 2 | See hexachords. |
| hexachordon minus | 1 | the minor sixth |
| hexachords | 7 | A hexachord is a part of a diatonic scale with six notes (ut, re, mi, fa, sol, la) covering a major sixth, where a central semitone is symmetrically flanked by two whole tones on both sides. The hexachord G-A-B-C-D-E is called *Hexachordon duris*, the hexachord F-G-A-Bb-C-D is called *Hexachordon mollis*, and the hexachord C-D-E-F-G-A is called *Hexachordon naturalis*. This system of three congruent hexachords goes back to Guido of Arezzo (992-1050). |
| hierarchy of ratios | 2 |  |
| imperfect consonance | 1 |  |
| infinity | 1 |  |
| inversion | 1 |  |
| music theory | 1 |  |
| just intonation | 1 | A tuning system in which the relations between two notes can be expressed by ratios of small whole numbers with the octave corresponding to the ratio 2:1, the fifth to 3:2, the fourth to 4:3, the major third to 5:4. While the ratios of the octave, the fifth and the fourth correspond to the Pythagorean tuning system, the major third there has a ratio of 81:64, since every whole tone has the ratio 9:8. However, with the ratio of the third being 5:4 in just intonation, the whole tone is 10:9 rather than 9:8, so that there are two different whole tone ratios in just intonation. |
| kappa-12 | 1 | See kappa-n. |
| kappa-14 | 1 | See kappa-n. |
| kappa-4 | 3 | The graph corresponding to the Pythagorean Tetraktys, if the musical ratios are interpreted as edges between the four nodes 1, 2, 3, 4. See kappa-n. |
| kappa-5 | 1 | See kappa-n. |
| kappa-6 | 2 | See kappa-n. |
| kappa-7 | 1 | The graph kappa-7 can be used two describe seven notes scales. Johannes Lippius (1585-1612) seems to be the first to arrange the notes of the syntonic diatonic on a circle and connect them pairwise. See kappa-n. |
| kappa-n | 1 | A graph with n nodes, in which each pair of nodes is connected by an edge. Up to n = 4, kappa-n can be represented in a plane without overlapping edges. |
| keyboard | 1 |  |
| cosmology | 1 |  |
| Kreis | 1 |  |
| lambdoma | 1 |  |
| Limma | 1 | The Pythagorean diatonic half tone. It is defined as the quotient of the fourth (4:3) and the Pythagorean major third (81:64), thus (4:3):(81:64)= 256:243. |
| logarithmic pitch | 1 | S. http://www.phon.ox.ac.uk/jcoleman/LOGARITH.htm |
| logarithms | 1 | https://en.wikipedia.org/wiki/Logarithm |
| lute | 4 |  |
| major triad | 3 | Chord stacking three tones in thirds. The basic structure of the major triad is root-major third-minor third, thus in C: C-E-G, its first inversion E-G-C and the second inversion G-C-E. |
| mesolabio | 3 | Mechanical tool for constructing geometric sequences. It can be used to divide a musical interval ratio into any number of equal parts. Its functioning is based on similar triangles. |
| microintervals | 1 | Intervals smaller than a diatonic half tone. Any division of the octave into more than 12 steps leads to microintervals. |
| microtones | 3 | The tones within any tuning system dividing the octave into more than 12 steps are generally called microtones, although it may be more precise to refer to microintervals between these tones, since these make up the microtonal system. |
| minor sixth | 1 | Interval of eight half-tones (e.g. c-a flat). The major sixth equals nine half-tones. |
| minor triad | 1 | Chord stacking three tones in thirds. The basic structure of the major triad is root-minor third-major third, thus in a: A-C-E, its first inversion C-E-A and the second inversion E-A-C. |
| modal scales | 2 |  |
| monochord | 18 | Literally “one string”, Greek musical instrument with a rectangular sounding board and usually one string with a bridge allowing to divide the chord at any point, thus making it possible to measure interval proportions. Later varieties could also have 2-4 strings tuned in unison. |
| musica ficta | 2 | *Musica ficta* or (earlier) *musica falsa* is a term used between the 12th and 17th centuries to refer to accidental pitches not found within the hexachord or the scale system in question. |
| Musiktheorie | 2 |  |
| n-tet | 1 | Tone system dividing the octave into n steps. |
| octave | 2 | Interval with the ratio 2:1. Expressed as frequencies, one octave above a tone is double, one octave below half its frequency. |
| octave replica | 3 |  |
| octave similarity | 1 | Octave similarity refers to the phenomenon that tones an octave apart are perceived as similar, as are whole melodies played an octave apart. When played together, tones at one or more octaves apart seem to “fit” into one sound since the frequency an octave above a sound is double, an octave below a sound half that sound’s frequency. |
| overtones | 2 | Overtones are the frequencies occurring above the fundamental frequency of a sound. The overtones influence the “colour” of a sound, the timbre. The fundamental and the overtones are the partials of a sound. |
| perfect consonance | 1 | In polyphonic music practice, the unison, perfect fourth, perfect fifth and octave are generally considered perfect consonances, while the third and sixth (minor and major) are imperfect consonances. Historically, there have been different definitions in music theory (for example, theorist Johannes de Garlandia in the 13th century considered the unison and the octave perfect consonances). |
| pitch circle | 1 |  |
| pitch classes | 2 |  |
| pitch grid | 4 |  |
| pitch topology | 1 |  |
| prism | 4 |  |
| Pythagorean comma | 8 | In Pythagorean tuning the small interval between two (enharmonically identical) notes such as F sharp and G flat. First mentioned by Euclid, the ratio of the Pythagorean comma is 531441:524288, which is approx. 23, 46 cents. In Pythagorean tuning, the comma is also expressed by the difference between twelve fifths and seven octaves, the difference between a chromatic half tone and a diatonic half tone (limma), the difference between twelve fifths and seven octaves and the difference between three ditones (major thirds) and an octave. |
| Pythagorean diatonic scale | 7 |  |
| Pythagorean diatonic tone system | 4 |  |
| Pythagorean number system | 2 | The numbers containing only the prime factors 2 and 3, i.e. numbers of the format 2^m\*3^n with non-negative integers m and n.  Boethius (c. 480 - c. 525) represented these numbers as a triangular matrix. If negative power indices are admitted, the numbers of this format form a multiplicative mathematical group, which can be canonically represented in a two-dimensional grid. |
| Pythagorean semitone | 4 | The Pythagorean tone system has two distinct semitones. The Pythagorean diatonic half tone is defined as the quotient of the fourth (4:3) and the Pythagorean major third (81:64), thus (4:3):(81:64)= 256:243 or approx. 90, 2 cents. The Pythagorean chromatic semitone’s (also known as Pythagorean apotome) ratio is 2187:2048 or approx. 113, 7 cents. It is expressed by the difference between four octaves and seven pure fifths. The difference between these semitones is the Pythagorean comma. |
| quarter tone | 1 | Interval that is a quarter of a whole-tone. In tempered tuning, the interval is 50 cents. |
| quinario | 1 | Italian five-syllable verse.  The set of numbers {1, 2, 3, 4, 5}, cf. *Tetraktys* and *senario*. |
| Quinque toni continui | 1 | A stack of five major tones of the ratio 9:8. The difference of an octave and five major tones consists of two Pythagorean diatonic semitones of the ratio 256:243, an interval being a Pythagorean comma smaller than a major tone. |
| Schisma | 1 | The interval between a Pythagorean comma and a syntonic comma. Its ratio is 32805:32768, which corresponds to 1.9537 cents. For Glareanus (1488-1563) the Schisma is half a Pythagorean comma and René Descartes (1596-1650) called the Syntonic comma 81:80 a Schisma. |
| semitone | 1 | Half-tone. The smallest tone step in 12-tet tuning. |
| senario | 2 | Italian verse with six syllables.  The set of numbers {1, 2, 3, 4, 5, 6}. It is an extension of the Pythagorean tetraktys {1, 2, 3, 4} and used by Gioseffo Zarlino (1517-1590) to justify the thirds 5:4 and 6:5 as consonances. The problem with the senario is that it contains the major sixth 5:3 but not the minor sixth 8:5. |
| Sesquidecimasettima | 3 | The ratio 18:17. This ratio is close to the ratio of the semitone in 12-tet: Twelve “semitones” of the ratio 18:17 are about half a Pythagorean comma (12.5 cents) smaller than an octave.  The Sesquidecimasettima was proposed by Vincenzo Galilei (1520-1591) for tuning the lute. |
| similar triangles | 1 | Two triangles of the same shape, i.e. with equal angles, are called similar triangles. Similar triangles have equal ratios of side lengths. |
| solmization | 10 | Solmization is the practice of associating syllables with pitches. It can be used as a means to teach and memorize melodies or to demonstrate and practice pitch structures. In Western music, the practice is generally ascribed to theorist Guido of Arezzo (992 to 1050 A.D.), assigning the pitches in a hexachord the syllables ut, re, mi, fa, sol, la. Later, the system was expanded to cover the octave. Also, in addition to the relative system (i.e. syllables corresponding to pitch structures, but not necessarily to absolute pitches), systems with reference to absolute pitches were adopted. |
| spiral | 3 |  |
| staff | 1 | In modern Western music, a notational space consisting of five horizontal lines and four spaces, each usually representing an absolute pitch. In some cases, the lines may also have a different function, such as to indicate the use of certain instruments (for percussion instruments) or the length of musical rests. Historically, first examples are found in diastematic Aquitanian neumes with one staff line. The use of four staff lines is attributed to Guido d’Arezzo (990 to 1050 A.D.). |
| superparticular ratio | 4 | Ratio where the greater number exceeds the smaller by one unit, e.g. 2:1, 3:2, 4:3. |
| syntonic chromatic scale | 15 | A chromatic scale with (at least) 12 pitches per octave taken from the syntonic tone system and corresponding to the 12-tet pitches. Because of the ambiguities of the syntonic tone system there are many different ways to select 12 pitches forming a chromatic scale. Johannes Kepler (1571-1630), Marin Mersenne (1588-1648), Isaac Newton (1643-1727), William Holder (1616-1698) and Leonhard Euler (1707-1783) offered structurally different syntonic chromatic scales with twelve pitch classes. Lodovico Fogliano (c. 1475-1542) and Francisco Salinas (1513-1590) give a syntonic chromatic scale with 14 pitch classes. Salinas also proposes a scale with 24 pitch classes, and Arthur von Oettingen (1826-1920) suggests an overarching syntonic system of 53 pitch classes. |
| syntonic comma | 9 | Small interval of approximately 21.51 cents. It corresponds to the difference between a Pythagorean major third (81:64) and a just major third (5:4). |
| syntonic diatonic scale | 13 | In the 16th and 17th century, two forms of syntonic diatonic scales were considered T-t-S-T-t-T-S and t-T-S-T-t-T-S, where T = major tone 9:8, t = minor tone 10:9 and S = semitone 16:15.  The former, proposed by Zarlino, contains three major triads of the ratio 4:5:6, and the latter, preferred by Descartes, contains three minor triads of the ratio 10:12:15. However, Descartes also suggests a diatonic scale with an ambiguous second degree.  Newton gives a syntonic diatonic scale with the structure T-t-S-t-T-T-S containing a Pythagorean third between the fifth and the seventh degree of the scale. |
| syntonic enharmonic tetrachord | 1 | Gioseffo Zarlino (1517-1590) interpreted the enharmonic tetrachord as the syntonic proportion 300:375:384:400, i.e. by numbers containing the prime factors 2, 3 and 5 only. |
| syntonic intervals | 1 | Musical intervals whose ratios can be expressed with the prime factors 2, 3 and 5. |
| syntonic tone system | 3 | Tone system using the perfect fifth (3:2) and third (5:4) as generators, i.e. the pitches of a scale are found by stacking perfect fifths and thirds and subtracting octaves to get the absolute pitch. |
| temperament | 6 | Any tuning system wherein intervals are adapted so that while pure intonation is given up they conform to specific tuning requirements. For example, pianos today are mostly tuned according to the segmentation of the octave into twelve equal half-tones, so that all keys can be played with the same tuning. |
| tetrachord | 1 | “Four-tone”. A pitch system contained within a perfect fourth. In ancient Greek theory, the three *genera* are determined by the spacing of the notes; diatonic (half-tone/whole-tone/whole-tone), chromatic (half-tone/half-tone/minor third) and enharmonic (quarter-tone/quarter-tone/major third). In modern theory and teaching, tetrachords are often used to point out the structure of major, minor and modal scales within the octave. |
| Tetraktys | 10 | Triangular figure with mathematical, geometrical and mystical significance in Pythagorean thought. It has four rows containing one point (first row), two points (second row), three points (third row) and four points (fourth row). It is thought that Pythagoras obtained the ratios for the basic intervals in the Pythagorean system from the tetractys: 2:1 (octave), 4:3 (perfect fourth), 3:2 (perfect fifth). |
| topology | 1 | s. http://mathworld.wolfram.com/Topology.html |
| transposition | 1 | Playing or notating music at a different pitch, i.e. moving all the pitches of a melody by a certain interval (e.g. C-D-C/E-F sharp-E). Geometrically, this corresponds to a translation in the pitch domain. |
| trinity | 2 | The divine unity of Father, Son and Holy Ghost in God. The concept was developed by the church between the fourth and seventh century and has been interpreted and developed by theorists and theologians through the centuries. |
| Tritonus | 1 | Tritonus or tritone, musical interval containing three whole tones, e.g. f-b. Although it is thus defined as an augmented fourth, a diminished fifth is generally also considered a tritonus in tempered tuning. Due to its instable harmonic character and having been forbidden in Guido of Arezzo’s hexachord system laid out in the 11th century, it has at times also been called *diabolus in musica* (devil in music) in earlier music practices up to the 16th century, while in later functional-harmonic styles it often takes on a strong dominant function with its possible resolution to the tonic and the third. |
| tuning | 8 | Tuning relates on the one hand to tuning systems defining pitches within the system (e.g. Pythagorean tuning etc.). On the other hand, it denotes the act of mechanically tuning an instrument (e.g. a string) to certain pitches. |
| whole tone | 1 | Interval of a whole tone, e.g. C-D, E-F sharp. The whole tone scale consists of six tones within the octave. The syntonic tone system has two different whole tones, the major tone of the ratio 9:8 and the minor tone 10:9, whereas the ratio of the whole tone in the Pythagorean tone system is 9:8. |