

# МУЗЫКА В ЗЕРКАЛЕ ФИЛОСОФИИ MUSIC IN THE MIRROR OF PHILOSOPHY



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## **DIALECTICAL SPIRAL OF THE CIRCLE OF FIFTHS**

The circle of fifths is one of the most significant concepts in classical music theory. Its theoretical and practical importance has been universally recognized. However, the worldview aspect of the circle of fifths has not been fully comprehended until now.

The circle of fifths is relevant only in conditions of equal temperament. The qualities of this system correspond to the image of a single homogeneous infinite space of the Universe, which has developed in the public consciousness of the Modern Period. It should be borne in mind that the equally tempered scale is an artificial one, created by the purposeful efforts of acoustics, theorists of music and composers who perfected the natural pitch spaces system by means of reason in full accordance with the ideas of the Age of Enlightenment. The result of their efforts was the creation of a new pitch system that meets the needs of music creators by artificially adjusting the natural scale.

The equal temperament provided the enharmonism of the same tones from different octaves

and the possibility, by moving along the circle of fifths, to carry out modulations in distant tonalities with a return to the original key. In this regard, the circle of fifths can be interpreted as a formula for a spiral movement, that is, development that meets the principles of Hegelian dialectics. Applying the principles of dialectics to the interpretation of the historical process, Hegel became the author of a new understanding of the world, called "historicism". Using the circle of fifths as a scheme of tonal-harmonic development and creation of a musical form, Hegel's contemporaries – representatives of Classicism – created musical images the development of which is carried out in a spiral.

In this regard, musical works whose tonal-harmonic plan is based on the laws of the circle of fifths can be understood as a sound recreation of the dynamics of historical time.

*Key words:* circle of fifths, equally tempered scale, tonal-harmonic development, musical form, worldview, dialectics, historicism.

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## **ДИАЛЕКТИЧЕСКАЯ СПИРАЛЬ КВИНТОВОГО КРУГА**

Квинтовый круг – одно из фундаментальных понятий классической теории музыки, теоретическая и практическая значимость которого считается общепризнанной. Тем не менее,

мировоззренческий аспект квинтового круга до настоящего времени осознан недостаточно.

Квинтовый круг актуален только в условиях равномерно темперированного музыкального

стройка, чьи качества отвечают образу единого однородного беспредельного пространства Вселенной – образу, который сложился в общественном сознании Нового времени. При этом следует учитывать, что равномерно темперированный строй – искусственное образование, созданное коллективными усилиями акустиков, теоретиков музыки и композиторов, которые стремились усовершенствовать натуральный звуковой строй в соответствии с идеями Просвещения. В результате путем корректировки натуральной шкалы была создана новая звуковая шкала, отвечающая потребностям музыкальной практики.

Равномерно темперированный строй утвердил энгармонизм одинаковых звуков из разных октав и возможность осуществлять модуляции в далекие тональности с возвращением в начальную, продвигаясь по квинтовому кругу. Исходя из этого, квинтовый круг можно трактовать как формулу движения по спирали, то есть разви-

тия, отвечающего принципам гегелевской диалектики. Применив данные принципы к интерпретации исторического процесса, Гегель заложил основы нового миропонимания, именуемого «историзмом». Используя квинтовый круг в качестве фактора тонально-гармонического развития и музыкального формообразования, современники Гегеля – представители классицизма – придали особую целенаправленность развитию музыкальных образов, осуществляемому по спирали.

Таким образом, музыкальные произведения, тонально-гармонический план которых имеет в основе закономерности квинтового круга, можно понимать как звуковое воссоздание динамики исторического времени.

*Ключевые слова:* квинтовый круг, равномерно темперированный строй, тонально-гармоническое развитие, музыкальная форма, мировоззрение, диалектика, историзм.

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A schematic circular representation of all major or minor keys, called the circle of fifths, is one of the fundamental concepts of classical music theory. Its first image is found already in the 17th century in Nikolai Diletsky's treatise "The Musikiya Grammar". To tell the truth, the author does not yet call it a circle; he uses the terms "wheel" or "musical wheel", imparting to a circular scheme the function of means of tonal development of a composition. In the section "On Amplification, that is On Expanding the Composition" Diletsky wrote: "This is necessary when expanding the composition, about which he already had instructions. In the circle ("wheel") written here, you can see that any succession can go through twelve systems and return to the first one from where it began" [1, p. 395].

There is no doubt that nowadays the circle of fifths has, first of all, a didactic purpose: it is widely used as a scheme for memorizing the relationship of tonalities and their key signatures. Besides, in full accordance with Nikolai Diletsky's recommendations, the circle of fifths serves as a kind of guide for music creators, as it clearly demonstrates the possibilities of modulations both in close and rather distant tonalities. In this regard,

both the creators of music and musicologists can hardly overestimate its practical purpose.

However, the circle of fifths also has another, no less important aspect, namely, the worldview one. The scheme which includes all major and minor keys existing within the framework of the tempered scale can be considered as a kind of formula for the understanding of the world that developed at the turn of the 18th and the 19th centuries. And since the circle of fifths is relevant only in conditions of equal temperament, in order to reveal its worldview status, it seems expedient to make a short excursus into the history of its formation.

The pitch space so familiar to modern times was the result of a long search and numerous experiments, in which some talented acoustics, theorists of music (M. Mersenne, J. Neidhardt, A. Werkmeister, J. Ph. Kirnberger) and outstanding composers (J. S. Bach, D. Scarlatti, F. Couperin) took part. The ultimate goal of acoustic experiments was to eliminate the Pythagorean comma which is the interval between the same notes of the different octaves, a kind of "gap", the difference resulting from the natural Pythagorean system which was formed on the basis of perfect fifths. For example, the note A which is seven octaves away from

the original one, will not sound in unison with the original pitch, it will differ from it by about a quartertone. The presence of the comma was the cause of the appearance of unpleasant consonances for the ear, and also greatly limited the possibilities of modulating in those tonalities which were far from the main key. Therefore, the formation of a new pitch space was intended to solve several problems at once: to eliminate the comma, to close the circle of fifths, to establish an enharmonic equality of pitches which did not exist in conditions of non-equal temperament.

The solution to the problem was dividing the comma into twelve equal parts and then reducing by each of these parts all the twelve fifths that make up the tuning, the total of which was seven octaves. Artificially changing the intervals in order to distribute (to "spread") them over the entire scale was called "temperament", that is the alignment of the scale: the octave was divided into twelve equal parts. Each of the octaves now includes six equal tones or twelve equal semitones.

The consequence of this alignment was the false sounding of all the intervals, with the exception of octaves, that remains a reason for criticism of the equally tempered scale to this day: "the tempered scale does not provide a single (except for an octave) perfect interval..." [2, p. 179]. However, this falsity turned out to be so insignificant that it was practically not sensed by the ear and did not prevent a person from enjoying musical consonances. The presence of this falsity was largely justified by the obvious advantages of the new scale: "a closed and enharmonic scale allows transposition of melody, consists of intervals that are quite acceptable for hearing both in melodic and in harmonic reproduction, has only twelve pitches in each octave and, therefore, requires a relatively simple structure of instruments" (cit. by: [2, p. 179]). Indeed, equal temperament has dominated the musical art for more than three hundred years, and attempts to challenge its priority position in the music of the European tradition have failed so far (see: [3; 4; 5]).

This "longevity" of the tempered scale is due, in our opinion, not only to musical-theoretical and musical-practical factors, but, as noted above, may also have a worldview justification. The appearance of the equally tempered scale and the formation of the circle of fifths can be presented as a kind of parallel to worldview innovations of the corresponding period, including the natural science discoveries of the 17th – 18th centuries, the ideas of the French enlighteners, as well as the world outlook of Georg Hegel based on the principles of dialectics, which were named "historicism".

The most significant in this regard is the fact that the equally tempered scale has not natural, but artificial origin. This is a scale, created by the mind and efforts of man, and therefore it can be considered the antipode of the Pythagorean natural scale, the basis of which was formed by objective mathematical laws. Artificially aligning the pitch space and thereby achieving enharmonism of the same notes of different pitches (referring to different octaves), a person transforms nature, deprives it of its "initial coarseness" and brings it to a state of perfection with the help of his intellect. Such activity fully meets the ideas of European enlighteners who dreamed of a rational transformation of the world, and also corresponds to the principles of the aesthetics of classicism, which required to imitate nature and imitate Antiquity. In this case, the imitation of nature consists in the use of acoustic experiments that take into account the structure of the overtone series and the characteristics of human auditory perception. As for the imitation of Antiquity, it was realized in the intrusion of man into the structure of the Pythagorean system, in the purposeful change of the range of intervals, in violation of the mathematical and acoustic perfection of consonances in order to create an ideal scale that meets the needs of creators and performers of musical works.

The formation of equally tempered scale not only eliminated the comma, but also solved the problems of closing the circle of fifths and established an enharmonic equality of altered tones, which did not exist in condition of non-equal temperament (for instance, *cis* and *des* sounded differently). Thus, the aforementioned innovations ensured the quality of potential infinity to the scale: the new system imparted the qualities of unity, homogeneity and infinity to the sound space; its boundaries were now set exclusively by the possibilities of human auditory perception. This means that the sound space in the condition of equal temperament was analogous to the image of the infinite homogeneous space of the Universe, which was formed in the public consciousness of the time under consideration thanks to the discoveries of N. Copernicus, G. Bruno, G. Galileo, and other outstanding thinkers and scientists.

As for the circle of fifths, it was an effective means of demonstrating all the advantages of the new tone scale. In particular, the circle became a clear evidence of the unity of all major and minor keys. The fact that the circle of fifths is built from any pitch of the equally tempered scale testifies to the universal interconnection and interdependence of all elements of the sound space, unfolding both along the melodic horizontal and harmonic vertical. This fully corresponds to one of the basic

principles of dialectical thinking that is gaining more and more authority – the principle of universal interconnection and interdependence. In this regard, it seems appropriate to consider the circle of fifths from the point of view of Georg Hegel's dialectical understanding of the world that was developing at the turn of the 18th and 19th centuries in order to show that the circular image of major and minor keys fully corresponds to the principles of Hegelian dialectics.

Despite the fact that the circle of fifths is depicted in the form of a corresponding geometrical figure, in reality the movement along the circle of fifths is not a closed circle but an open spiral going into infinity. Theoretically, "the sharp circle of fifths and the flat circle of fifths exist independently, to be formed a kind of spiral" [6, col. 765]. The reason for the movement along spiral of fifths is the opposition of the tonic (thesis) and the dominant of each of the tonalities that make up the circle. As a result, the dominant (antithesis), in turn, becomes the main stable tone (tonic) for the nearly related tonality (the first degree of relationship). The subsequent movement in fifths leads to the accumulation of quantitative changes (an increase in the number of altered pitches), the result of which (after 12 steps) is a return to the original key and the tone of the same quality but several (namely, seven) octaves higher or lower than the initial one. Such a result is possible only in conditions of an equally tempered scale, which ensures the phenomenon of enharmonism of altered tones. In this regard, the circle of fifths can be viewed as a sound illustration of Hegel's law of negation of negation, which indicates the spiral nature of all development. For example:

C – G – D – A – E – H – Fis (Ges) – Cis (Des) – As – Es – B – F – C

But it is precisely in this way (through the negation of the negation), according to Hegel, that the historical process unfolds both at the level of human history and on the scale of the Universe. This image of historical time moving in a spiral created by the genius of Hegel was in opposition to the previous concepts – the natural concept of time-cycle and the mechanistic concept of time-line. The Hegelian spiral transformed the closed natural cycle into an ascending spiral, and also overcame the senselessness of the mechanistic movement in a straight line directed to infinity, imparting the history the quality of purposefulness and conformity to law and providing an opportunity to determine its main stages, that is to reveal the structure of the historical process. Drawing parallels with these above-mentioned worldview innovations, it can be argued that the tempered scale system opened the way for the reconstruction of the process of

developing in a spiral in the tones, and the circle of fifths became a kind of guide to this reconstruction.

It should be borne in mind that the equal temperament is a system artificially constructed by man and it differs significantly from the natural (Pythagorean) tuning. Accordingly, the musical processes expanding in its conditions can be interpreted as a recreating not the natural cycle and not mechanical movement-transference but as the dynamics of history developing in accordance with the laws of dialectics created by humans that is, creating the image of historical time.

Being the focus of the advantages of the equally tempered scale, the circle of fifths has become a kind of tool for modulating the key of any degree of relationship and, consequently, for making a tonal-harmonic plan for musical compositions. The ability to modulate into distant tonalities has opened the way to the creation of sufficiently long musical works filled with dynamics and expression, which demonstrates the closest relationship between their harmonic plan and musical form: "Any form, including the largest one in all its integrity is only a reproduction "in enlargement" of the general tonal-harmonic "first idea" [7, p. 327].

In this context it is significant that it was the musical theory of classicism in which the term "modulation" acquired its modern meaning. The doctrine of modulation as a process of simulation (Modulatio) occupied a very important place in the theory of music of the Classical era, since it furnished the clues to the secrets of constructing large and small musical forms", writes L. Kirillina [8, p. 47]. If earlier the term modulation was understood as a means of "expanding" a mode according to its intrinsic laws, then in the period under review this term began to mean precisely a change in tonality, a transition from one key to another. It is really necessary to explain modulation as a means of creating form and the form itself as a result of modulation. After all, this is how (in "circles") the harmonic "formation of the form takes place, its progress from one level to another, and the "multi-departmental" posing of the question of modulation – as simultaneously a phenomenon of harmony and form – is in fact the only possible one (both for modulation and form)" [7, p. 326]. This functional potential of the circle of fifths, as noted above, was already pointed out by N. Diletsky, whose early insight is all the more surprising since the process of the equally tempered scale and the major-minor scale system in theory and practice was completed later – at the turn of the 18th and 19th centuries.

Indicating the direction of the developmental process, which inevitably returns to the main tonality, the circle of fifths imparts to the musical

form the features of the dialectical spiral both at the figurative-thematic and the tonal-harmonic level. This is especially true for works that have the structure of a sonata allegro, where the whole set of dialectical principles is presented. "With the growth of the form, the original harmonic idea spreads to all new levels in an intensified form, but the general principle of the primacy of the tonic over all the others operates everywhere, regardless of the scope of what is happening – both at the level of the initial harmonic construction with its succession of chords and at the level of the whole of any large dimension with its succession of tonalities" [7, p. 326].

Already the Viennese classics (in contrast to the masters of the musical baroque) used deviations from the original tonality to rather distant ones, the focus of which, as a rule, became the form of the sonata-allegro. If the first subject in the exposition only "outlines" the main key (acts as a thesis), then the second subject sounds here in one of the keys of the first degree of relationship (it is an antithesis). The development section demonstrates the wide possibilities for modulations that appeared with the equal temperament, which are increasingly moving the musical process away from the initial thesis. As for the reprise, it fulfills the function of synthesis: a return to the original key and its confirmation by sounding both (the first and the second) subjects in this key. Thus, by means of music, the Hegelian assertion is realized: "Something is only what it is in its relation to another, but by the negation of the negation this something incorporates the other into itself..." [9, p. 177].

Directing the tonal-harmonic development of the works of musical Classicism, the circle of fifths inevitably returns the tone process to its original tonality, as if "twisting" its musical form into a dialectical spiral. This allows us to consider the samples of the sonata-allegro form as a tone embodiment of the

spiral movement and, in particular, the dynamics of social history. As for other, simpler, musical forms (for example, the three-movement form or the rondo), they also have the ability to recreate the image of a spiral in the event that, following the scheme under consideration, they are filled with intense tonal-harmonic development acquiring the features of sonata form (Allegro).

The ideal tone embodiment of the dialectical spiral could be a musical process that successively modulates in the nearest key and thus covers all keys of the circle of fifths with a return to the original one. N. Diletsky already pointed out the existence of such a possibility: "In above circles I saw that one construction can pass through all letters, starting from a simple – to flat and sharp ones" [1, p. 396]. However it is not possible to name a specific example of such a composition. Indeed, it is quite difficult to imagine a composition whose tonal-harmonic plan would embrace absolutely all the tonalities of the circle of fifths, that is, it would carry out a full turn of the spiral. The phenomenon of enharmonism allows to avoid the need to cover all the tonalities of the circle, and it allows us to shorten the path significantly "reducing the diameter" of the turn of the dialectical spiral. Due to the enharmonic equality of tones and harmonic functions in conditions of equal temperament, it is possible to quickly return to the original tonality from any distant key, and this opportunity is actively used by the creators of musical compositions.

Summing up, it should be stated that the circle of fifths (or the fifths spiral) can be viewed as a musical theoretical model demonstrating the validity of Hegel's dialectical principles. The theoretical embodiment of these principles was the dialectical understanding of history proposed by Hegel. In artistic form they were recreated in the works of his contemporary art of musical classicism.

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