STUDIA UBB MUSICA, LXIX, Special Issue 3, 2024 (p. 165 – 179)
(RECOMMENDED CITATION)
DOI: 10.24193/subbmusica.2024.spiss3.09

RECONCEPTUALIZING MUSICAL TEMPORALITY: THE INFINITE SOUND AND PERPETUAL MOTION IN LIGETI'S *CONTINUUM*

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SUMMARY. Through making a major contribution to the evolution in contemporary music, György Ligeti has become recognized as one of the most innovative composers of the twentieth century. Ligeti, whose work is renowned for his uncompromising examination of new textures and sound forms, became accomplished at pushing the boundaries of traditional composition through the inclusion of techniques such as micropolyphony and structured rhythms that made music more intricate. Ligeti explored dense layers of sound in his songs, which culminated in works of music that comes extremely close to being a tactile listening experience. Throughout the time that Ligeti looked for fresh sources of inspiration and unconventional timbres, he contributed to the discovery of the harpsichord during this time. Composing works such as "Continuum," in which the harpsichord is used to generate the sensation of continuous motion and musical infinity, he was fascinated by the instrument's capacity to produce a variety of sound colors via clear and repetitive attacking techniques. Due to this, Ligeti managed to not only revive interests in the harpsichord in modern music but also showcase how a standard instrument can be converted into a vehicle to express the avant-garde in the realm of music.

Keywords: Ligeti, Continuum, harpsichord, sound colors, modern performance, analysis

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Introduction

This article aims to investigate and improve our comprehension of György Ligeti's distinctive composing style, emphasizing its importance under the framework of 20th-century music. Ligeti, distinguished for his groundbreaking discoveries in sound texture and polyphony, had significantly influenced the evolution of contemporary music and the rediscovery and reimagining of early instruments like the harpsichord. The inclusion of the harpsichord in his latest compositions demonstrates an appealing resurrection of Baroque artistic ideas, merging classical components within a contemporary and avant-garde musical framework. The article will elucidate the significance and complexity of Ligeti's style and its influence on the interplay between tradition and innovation in contemporary music through a comprehensive analysis of his harpsichord work, *Continuum*.

György Ligeti's compositional style evolved in the 1960s to reflect developments in the current music landscape, adopting an experimental and systematic approach to sound exploration similar to that of contemporary composers such as Xenakis, Penderecki, and Stockhausen. Ligeti's works throughout the 1980s and 1990s became more approachable, approaching tonality or a 'non-atonal' style[3]. This follows a broader tendency in contemporary music in recent decades of moving away from modernist aesthetics and toward a postmodernist approach that returns to tonality without inhibitions.

Béla Bartók influenced Ligeti, particularly between the 1950s and 1980s, with his use of Hungarian rhythms and melodic inflections. However, his music from the 1960s is defined by geometric fragmentation, the abandonment of harmony and melody in favor of texture and timbre, and dense polyphonic structure. During this time, Ligeti totally abandons traditional composing methods, as evidenced by the work *Atmosphères* for orchestra, in which harmony is built on semitone agglomerations, erasing any discernable melodic line. This style of writing introduces a sort of polyphony known as micropolyphony, which is distinguished by dense canonical lines that move in various rhythms, resulting in intricate sound clusters.

Throughout the 1960s, Ligeti perfected the concept of *micropolyphony*, employing it as a versatile and delicate compositional tool similar to Steve Reich's methods. The compositions *Lontano* (1967) and *Lux Aeterna* (1966) demonstrate this method, which relies less on broad textures and more on arrhythmic canons that progressively generate clusters of tones and semitones. In *Lux Aeterna* Ligeti generates sonic intensity by altering the dynamics of

[3] Searby, Mike. "Ligeti the Postmodernist?" In *Tempo*, New Series, 199, 1997, pp. 9-14, p. 15.

voice sources, resulting in complex discordant effects. The sound clusters contain more than just overlapping half steps; they also include minor tones and thirds, producing a sense of harmony, but not in the typical sense.

In his instrumental compositions a shift from largely harmonic to predominantly melodic writing is evident. In these compositions, Ligeti uses rhythmic and dynamic changes to highlight the lyricism and originality of melodic lines. He refers to the restoration of melody as a rediscovery of the "forbidden fruit" of modern music[4]. This rediscovery of classical elements - harmony, melody, and rhythm - was more than just a return to the past; it was a re-evaluation of these principles through the lens of his previous explorations. In later works Ligeti broadens the harmonic palette by employing microtonality and odd tunings, resulting in a more expressive musical language. Furthermore, the use of more clearly defined structures and early music forms, like as the passacaglia, demonstrates the progression of his compositional style, emphasizing a balance of invention and tradition.

Fundamental principles of composition in the music of György Ligeti

Sound mass composition

The concept of *sound mass* is designed to capitalize on the limitations of sound perception by facilitating the excessive agglomeration of sound across musical time and sound frequencies. Through representative works that delineate the theoretical foundation of this concept, composers like Karlheinz Stockhausen have made a significant contribution to the theoretical and aesthetic definition of the term "sound mass." These compositions also underscore the concept's application in the works of composers such as Ligeti, Xenakis, and Penderecki[5].

The sound mass can be achieved through a variety of compositional techniques, such as clusters, stochastic procedures, micropolyphony, extended instrumental techniques, or orchestration: "... Sound mass exists when the individual identities of multiple sound events or components are attenuated and subsumed into a perceptual whole that nevertheless retains an impression of multiplicity"[6].

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[4] Ligeti, György, Varnai, Péter, Häusler, Joseph. *Ligeti in Conversation*. Ed. Eulenburg Books, London, 1983, p. 137.

[5] Stockhausen, Karlheinz; Maconie, Robin. *Stockhausen on Music: lectures and interviews*, Ed. Marion Boyars Publishers Ltd., London, 1989.

[6] Chelsea, Douglas; Noble, Jason; McAdams, Stephen. "Auditory Scene Analysis and the Perception of Sound Mass in Ligeti's Continuum" In *Music Perception*, 33, 3, 2015, pp. 287-305.

In addition, the authors underscore that the complexity of sound organization, which encompasses the rhythmic, melodic, and spectral parameters of a composition, is a component of sound mass. The concept of sound mass will be a central focus of the analysis of the selected work, as György Ligeti's compositional methods are closely linked to it.

The micropolyphony

Ligeti's contrapuntal technique may be analyzed using this distinction as a valuable starting point; however, it is oversimplified. Ligeti has consistently demonstrated his appreciation for contrapuntal practices and early music and believes that these influences have had a significant impact on his career as a composer. It is incorrect to infer that Ligeti's mature music should be interpreted in tonal or modal terms. However, it is logical to consider that the conception and listening of Ligeti's micropolyphonic music may be influenced by the restrictions and conditions of early music counterpoint, particularly imitative counterpoint.

György Ligeti's early works are replete with micropolyphony. This method entails the layering of numerous melodic lines that move at varying speeds and rhythms, resulting in a dense and intricate texture. In his 1961 work *Atmosphères*, Ligeti forsakes conventional harmonies in favor of a dense network of sounds that are generated by the interaction of multiple voices. Each instrument in the orchestra contributes individual sections, which typically consist of long sustained notes or slowly changing groups of notes, which combine to form an ever-evolving soundscape.

Other works, such as *Lux Aeterna*, are among the numerous works in which Ligeti incorporates micropolyphony, which became a fundamental aspect of his style. Ligeti employs micropolyphony to generate music that is both eccentric and captivating, thereby investigating the expressive potential of dense and intricate textures in these compositions. A distinguishing characteristic of Ligeti's micropolyphony is the utilization of cluster chords, which involve the simultaneous playing of adjacent notes, resulting in a dense yet dissonant harmony. Ligeti frequently employs techniques such as gradual changes in dynamics and timbre to underscore the sense of movement and transformation in his music. In general, Ligeti's unique sound universe is fundamentally characterized by micropolyphony, which enables him to compose music of unparalleled complexity and profundity.

Meccanico pattern

György Ligeti has frequently discussed his passion for automobiles and how this passion is reflected in his music. He asserts that the ticking and clicking of the pieces he refers to as *meccanico* are the result of a fascination that has existed since his infancy. Ligeti employs the Italian term *meccanico* in a general sense, referring to sections of any of his compositions that evoke machinery that has gone awry, rather than those that employ a specific compositional technique.

In an interview with Péter Várnai, Ligeti shares a childhood memory that is connected to his love of mechanical sounds:

> *I was approximately five years old when I accidentally received a book of short stories by Gyula Krúdy, which was not suitable for children." I recall feeling unusually melancholy during the summer, possibly due to the humidity or the fact that I was reading Krúdy's stories in solitude in the attic. One of the narratives revolved around a widow who resided in a residence that was replete with ticking timepieces. The mechanical pattern in music is truly the result of reading that narrative on a hot summer afternoon when I was five years old. Subsequently, additional everyday experiences have contributed to the memory of a house filled with ticking clocks, such as the images of buttons we press, cars that either start or fail to start, elevators that occasionally operate or stop on the incorrect floor, and Chaplin's "Modern Times," one of the most memorable cinematic experiences of my childhood. I have always been captivated by recalcitrant machinery and unmanageable automata*.[7]

Ligeti's fascination with malfunctioning machinery is expressed musically in his 1962 experimental composition, *Poeme Symphonique*, which is composed for one hundred metronomes. This work, which was a narrative with instructions rather than a score, was never published[8]. Until they all cease, the metronomes tick mechanically at varying velocities, each slowing down in its own time. Their interaction generates rhythmic patterns that undergo a continuous process of evolution and reduction in complexity as the metronomes cease to function one by one. Nevertheless, upon listening to the metronome work in the context of the pizzicato movement in

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[7] Ligeti, György, Varnai, Péter, Häusler, Joseph. *Ligeti in Conversation*. Ed. Eulenburg Books, London, 1983, p. 14.

[8] Piper, Clendinning, Jane. "The Pattern-Meccanico Compositions of György Ligeti" In *Perspectivse of New Music*, 31, 1, 1993, pp. 192-234.

the *String Quartet*, for example, or the harpsichord work, *Continuum*, it becomes apparent that the metronome piece served as a preparatory stage for the pizzicato movement[9].

The *meccanico* sections are distinguished by a sequence of melodic lines that overlap, each of which is composed of small groups of swiftly mechanically repeated sounds that undergo gradual changes in melodic content. The notes are arranged in a specific order, and the overall order of the units remains consistent, even if the pitches of some of the units change during iteration. The melodic lines undergo a rapid change in pitch as a result of the short duration of the sounds designated to the notes, which are eighth notes or shorter, in conjunction with the fast tempos. A compound melody is generated by the rapid repetition of the small units, which enables the pitches to nearly coalesce into a chord. Each melodic line contains a lead voice that connects adjacent harmonies.

Despite the fact that Ligeti incorporated meter and measure indications into his mechanical compositions to facilitate the coordination of components, he mentions that the works should not be performed with metrical accents. In order to enable the performer to maintain their position in the score, dotted lines are used to indicate the passage of each sixteenth-note group in the keyboard pieces. Ligeti's compositions from this era are characterized by this approach to metrical notation. In his interview with Peter Varnai, he states, "... Of course, I continued to employ bars and conventional musical notation in the majority of my compositions. In the music proper, however, the dotted bars served solely as reference points to prevent the four string players in a quartet from becoming disaffected. My music is a continuous, uninterrupted stream of bars[10].

Although not all compositions in the *meccanico* style are exclusively constructed through pattern repetition techniques, a significant portion of the work is. The *meccanico* activity in *Continuum* or *Coulée* lasts for approximately three and a half to four minutes, from the opening notes of the work to the final notes. The eighth piece of the *Ten Pieces for Wind Quintet* and the fifth part of the *Second String Quartet* are two additional compositions in this group that commence with a section of the *meccanico* pattern. This section is distinguished from the contrasting material that follows by sustained notes. Ligeti integrates his concept of *modello meccanico* with other compositional techniques, including the microcanon and, in the case of *Drei Phantasien*, homophonic, *noncontrapunctuated* writing, in a number of subsequent compositions,

[9] Ligeti, György, Varnai, Péter, Häusler, Joseph. *Ligeti in Conversation*. Ed. Eulenburg Books, London, 1983, p. 34.
[10] Ligeti, György, Varnai, Péter, Häusler, Joseph. *Ligeti in Conversation*. Ed. Eulenburg Books, London, 1983, p. 35.

including *Ramifications*, the second part of *Monument-Selbst-Selbstportrait-Bewegung* (1976), and *Drei Phantasien* (1982)[11].

Continuum by György Ligeti

Composed in 1968, *Continuum* for harpsichord is a unique genre in Ligeti's mature works, in which sequences of pitches and intervals build progressively against the background of an articulated structure, unfolding, in the composer's words, '... like a precise clockwork' (Hicks 1). Using a very fast and consistent note succession in tremolo figurations, Ligeti created this kind of mechanical music, which at the end abruptly cease 'as if they had been ripped away'[12].

Early 1960s electronic music studios saw Ligeti listening to electronic etudes created by Gottfried Michael Koenig, in which a sequence of various tones loop, sounding at a pace of over twenty sounds per second. The several tones are still heard, but it is impossible to separate the ordering: the fast repeated sounds become a chord. Ligeti included these recurrent sonorities in *Continuum* for harpsichord, his first published work in which he fully developed the mechanical technique.

Based on my study of this work, I have not come across any clear examination of the style applied; nonetheless, Ligeti's remarks on continual rhythmicity are echoed here: "...The beat you sense is not the one produced by the note sequence your fingers follow. The piece's actual rhythm is a pulse resulting from note dispersion and note frequency of recurrence."[13]. Unknown to his American counterparts Terry Riley and Reich, Ligeti used quasi-minimalist methods in this work - although without tonal content and without clear meter (the broken bar lines serve simply as orientation). Here, though, as in Terry Riley's *In C* (1964), the focus is on overlapping brief sequences and, as in all of Steve Reich's 1960s works, on sequence alterations. In Ligeti's work, a sequence consists of patterns of 2-5 sounds (one sound for each finger); overlapping and shifting happen by adding or changing a sound. At least 14 sounds per second, the great speed produces a whirl of strobe-like sound from continuously changing diatonic-chromatic clusters. The leitmotif intervals that show at pivotal points in the work—the

[11] Piper, Clendinning, Jane. "The Pattern-Meccanico Compositions of György Ligeti" In *Perspectives of New Music*, 31, 1, 1993, pp. 192-234.

[12] Hicks, Michael. "Interval and Form in Ligeti's Continuum and Coulée" In *Perspectives of New Music*, 31, 1993, pp. 172-190.

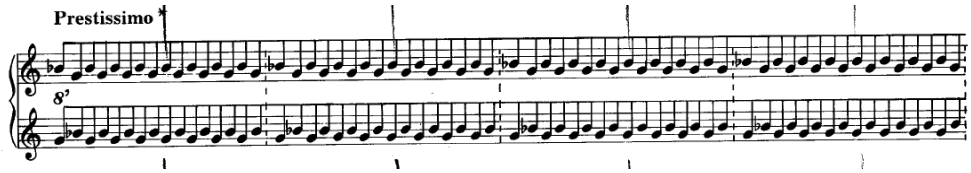
[13] Ligeti, György, Varnai, Péter, Häusler, Joseph. *Ligeti in Conversation*. Ed. Eulenburg Books, London, 1983, p. 61.

Bb-G third at the opening, the Bb-Fb Sharp fifth just before the midpoint, the F Sharp-Bb at the end—allow one to sense the structure.

Of course, the main and most significant impression is that of an unbroken soundtrack - from one of the instruments with the quickest sound decay time of all. Among other things, we perceive in *Continuum* the pretense of a stationary sound and the so-called intrinsic patterns (we hear not the several tone shifts, but those resulting from the superposition of several intervals).

Although Ligeti makes it clear that in his works, he does not want a sectionalization of the general form, the first section is nevertheless clearly visible and can be understood as an introduction. The work opens with a minor third, G-B Flat, the first symmetrical interval. This section holds 9 “measures”. The example above shows that the number eight at the beginning of the work is not the transposition to octave, but the number of seconds.

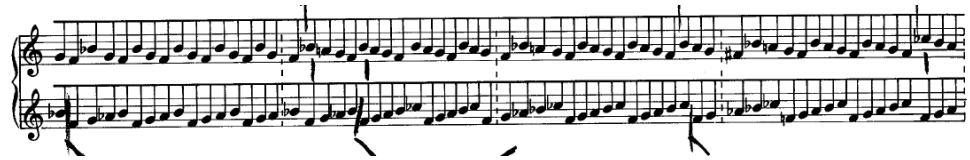
E.g. 1



G. Ligeti, *Continuum*, the beginning of the first section

The first noticeable change occurs in “measure” 10, where the F is introduced, thus changing the interval from a minor third to a perfect fourth. After 27 repetitions of the F note, another note is introduced, this time in the left hand, A Flat. After a few repetitions of this sound, in measure 18 an A in the right hand appears, creating an unregulated pulsation, blurring the musical text even more.

E.g. 2



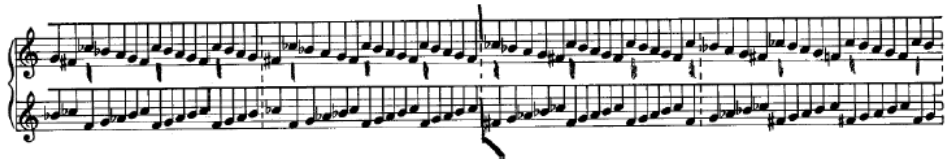
G. Ligeti, *Continuum*, the A in the right hand

Next, the B is added to the left hand above the top note (B Flat), extending the total range to a tritone. Finally, F Sharp is added, filling the

entire chromatic space in this tritone interval. Within seconds, the texture has transformed from a static pulse into a blurred mess.

The unstable "blurriness" is highlighted when the pitches organize themselves almost organically into symmetric ascending and descending shapes that appear quite clearly as very low-frequency sine waves (mm. 28-29). For a few fleeting measures, we perceive a pulsation as a cascade formed by pentachords.

E.g. 3

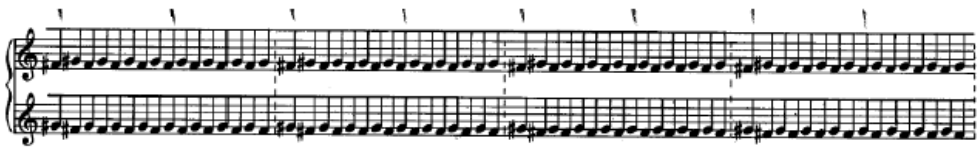


G. Ligeti, *Continuum*, mm. 28-31

The symmetrical pattern gradually fades again as the pulsations become more irregular. There is a sense of acceleration as the repetitions are organized into smaller and therefore shorter units, first chaotically, then approaching order again.

The pace seems even faster as the sound pattern thins out, becoming just three notes spanning a minor third (F Sharp/G/G Sharp/A). The opening notes are now a minor half step away, but the method of gradual transformation makes the listener unaware of this movement. In less than a minute, we're back in a familiar place. Eventually, the A sound is dropped, and we are back again to a "static" state based on the F Sharp/G Sharp semitone (or "interval signal"). Here the moment signals the end of the first section.

E.g. 4



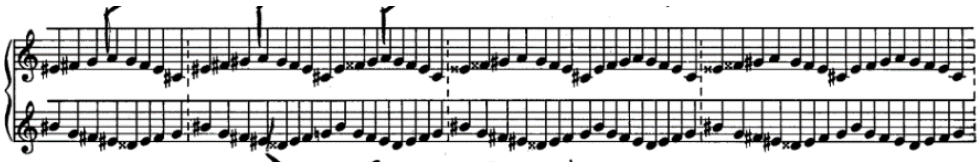
G. Ligeti, *Continuum*, the end of the first section

Section II shows a similar process of fading the intervallic signal and then forming them into extended symmetrical units, but here the interval is extended and the notes are presented in an almost diatonic manner.

With the addition of C Sharp under the main sound structure, the pattern begins to sound like a Major triad on C Sharp that rises and falls rapidly.

The next added note is a B Sharp, which extends the interval range to its widest range yet, a Major seventh. In tonal conditions, the B Sharp would act as the principal sound of the C Sharp major scale, but in this case, the function is not so clear. One would at least expect the B Sharp to stand out clearly, as the highest line normally does in a polyphonic texture, but the harpsichord noise turns it into little more than a faintly flickering pixel (this observation is based on a subjective listening of harpsichordist Joyce Chen's recording of the work[14]). An E is added to the center of the sound pattern, filling the chromatic space. Shortly thereafter, an A enters, emerging from the texture much more clearly than the preceding B Sharp.

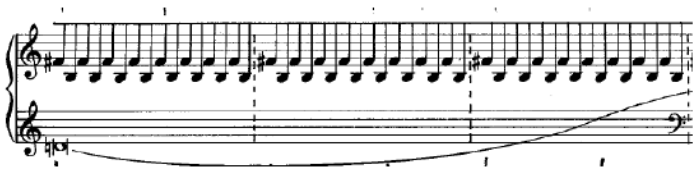
E.g. 5



G. Ligeti, *Continuum*, the climax of the second section

After a stirring and chromatic section, the musical discourse instantly flattens from hexachord to bitony, characterized by the perfect fourth interval, F Sharp-B.

E.g. 6



G. Ligeti, *Continuum*, the beginning of the third section

This section alludes to tonality, its counterpoint made imperceptible by the stuttered and overlapping forms. The tonal/diatonic feel of this section is heightened by the satisfying arrival, at "measure" 87, of a major triad on B.

The third section of *Continuum* is both the most structurally unique and the most climactic. In fact, it could be said that, from this point on, the piece seems to be in a continual state of climax (quite astonishing, considering that the piece is not even halfway through.) While the previous two sections appear as a constant flow that stirs and then settles again, this section unfolds with

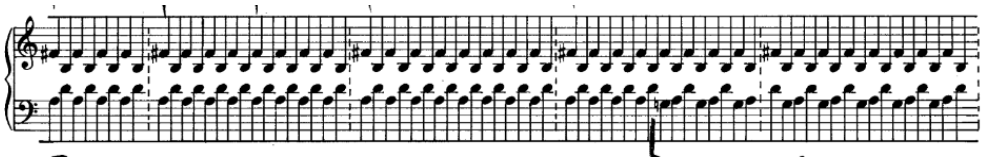
[14] György Ligeti: Continuum (1968) / Joyce Chen, harpsichord, https://youtu.be/zRItK87Cn2s?si=qWT_iZ1heNMCCxgb (11.09.2024)

a clear sense of direction (in terms of sonic material). This direction, however, is split in two, as if magnets were placed both above and below the form.

After a few bars, the left-hand D Sharp is replaced by a D, transforming the sonority into a B minor chord in a tight B minor position. It is also surprising that the D Sharp and D here are the first pitches to be allowed to completely unravel without being immediately interrupted by repetitions.

The first new interval added is a perfect fourth, A-D. This progression is almost identical to the starting measures, where a F is introduced under the interval G-B Flat, to create the same combination of intervals. The main difference here is that the pulsation has accelerated.

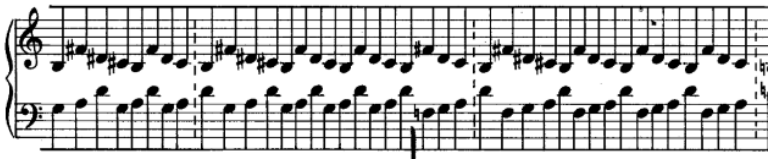
E.g. 7



G. Ligeti, *Continuum*, the first bars of the third section

In the following few measures, four more notes are added to the texture, in the following order: G (bottom), C Sharp (middle), Do Sharp (middle), F (bottom). The texture now contains a range of eight sounds. From the bottom up, these are: F, G, A, B, C Sharp, D, D Sharp, F Sharp. The middle semitone group (C Sharp/D/D Sharp) gives it an unsettling quality, suggesting more movement is imminent.

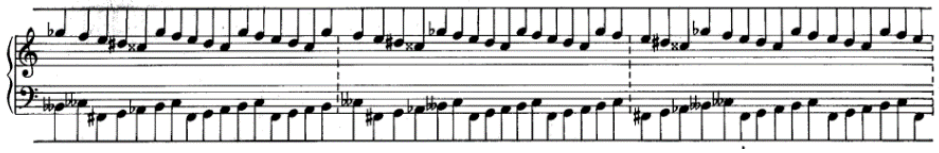
E.g. 8



G. Ligeti, *Continuum*, the four notes chromatic scale

After the scale of 8 sounds have been set, the whole texture sharply and evenly splits in two directions, the left hand descending into the register, while the right hand goes up. All notes pulse at the same rate, but Ligeti carefully staggered the changes to give the sensation of smooth and accelerated motion.

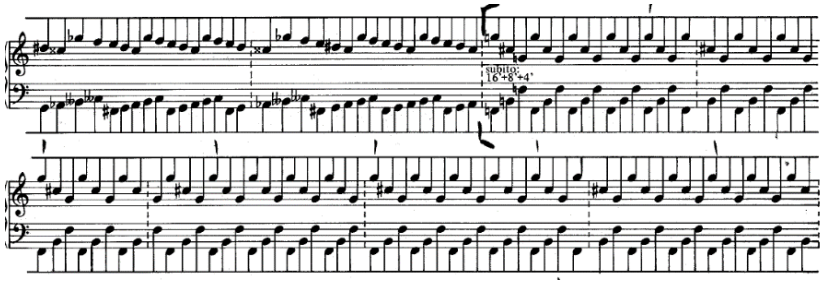
E.g. 9



G. Ligeti, *Continuum*, the opposite movement in both hands

In “measure” 119, we reach another stability point, as the displacement locks into another perfectly symmetrical sounding of major third scale in opposite directions, separated in turn by the interval of a major third (plus an octave). The right hand interprets a descending cascade of chromatic tones from F Sharp to D, while the left hand interprets a perfectly mirrored but slightly offset version, who climbs from a F Sharp to B Flat. Surprisingly, this is the first occurrence of an octave and acts as a brief prefiguration of the climax use of octaves to measure 126, when the outer voices of each major third simultaneously step outward to form tritons, dividing two octaves into two. The score indicates the change of the registers and manuals of the harpsichord, the top keyboard to be drawn, further emphasizing the climax power of these octaves. This transition from Section III to IV resembles the transition from II to III, where the outer voices of a stable, symmetrical pattern step sharply outward in opposite motion to form a new interval (the B Major triad in this case).

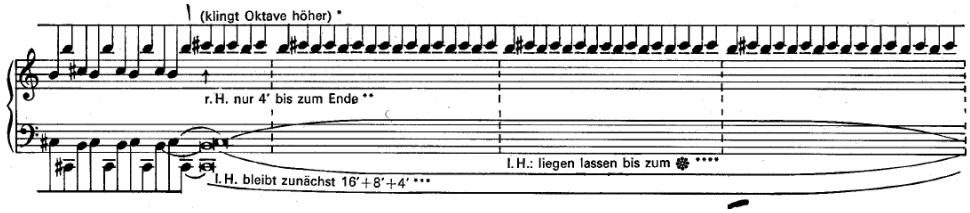
E.g. 10



G. Ligeti, *Continuum*, the climax of section 3

The fourth section of the *Continuum* is the shortest and minimal, but also the most climactic. All the registers are drawn, everything sounds at the upper octave, and the climax officially begins.

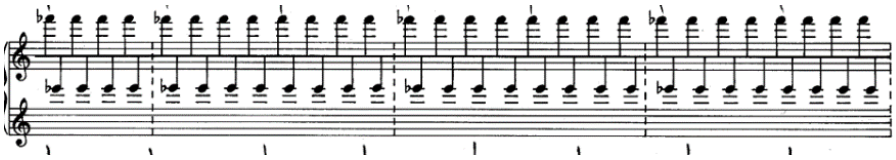
E.g. 11



G. Ligeti, *Coninuum*, the beginning of the fourth section

The octaves on the right hand climb four semitones, and the octaves on the left descend equally, but in a desynchronized way. Quite an open interval texture involves a modal movement. The end of this section is currently stabilizing on a minor semitone (F Flat-E Flat), but there is no harmonic movement before or after to suggest even the slightest identity as a dominant agreement.

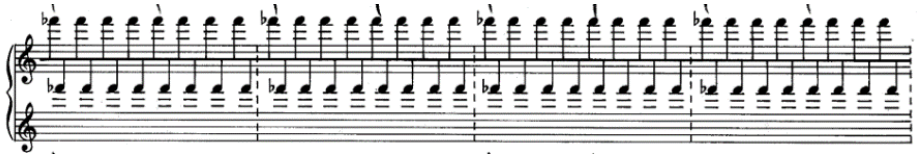
E.g. 12



G. Ligeti, *Continuum*, the final measures of this work

After this section follows an even more atypical one, hard to execute for any musician; the F Flat repeated for twelve "measures" puts in difficulty the harpsichordist, because it requires an extraordinary soft touch.

E.g. 13



G. Ligeti, *Continuum*, the final measures

Despite some obvious "snaps" of tonality, Ligeti takes great care to avoid any tonal involvement that does not immediately change or overlap with another in a confusing way.

Conclusions

György Ligeti's *Continuum* is a seminal work that revolutionized the musical language for the harpsichord, introducing technical and expressive innovations that have profoundly influenced the interpretation of this instrument. The unconventional exploration of extended registers has opened new perspectives on the harpsichord's capabilities, transforming it into an instrument for modern and avant-garde exploration.

Although Ligeti approached the harpsichord from a contemporary perspective, *Continuum* is notable for its return to Early music stylistic principles, integrating traditional techniques and structures within an innovative context. This blend of tradition and innovation has captured the imagination of contemporary harpsichordists, who appreciate both the reverence for the instrument's history and its modern contributions.

The significance of *Continuum* is also reflected in the complexity and textural variety it offers. Ligeti created a dense and dynamic musical texture that challenges performers to explore a wide range of techniques and nuances, providing listeners with a captivating and innovative auditory experience.

Continuum by György Ligeti will forever be a part of my harpsichord repertoire because of the unusual texture and sound it possesses. An exceptional technique is required from the performer in order to complete the work. Relaxation is the most essential component of this work since it is the only way that the fingers can move swiftly, and unique sounds may be produced. In addition, tempo is an essential component in the performing of this work. If you do not have a tempo that is sufficiently quick, you will not be able to produce a sound that is continuous.

Ligeti has demonstrated remarkable originality in *Continuum*, offering an innovative vision of a traditional musical form. This work is considered a pioneering example in harpsichord music, reflecting Ligeti's desire to push the boundaries of the instrument and explore new sonic dimensions.

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