

The Topological Model in the Works of Yuasa Jōji

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The oeuvre of Japanese composer Yuasa Jōji holds a singular place in the contemporary musical landscape. From the artist collective Jikken Kōbō, in which he took part during the 1950s, to his later pieces for large orchestra, and through his innovative electroacoustic and mixed-music, Yuasa single-handedly explored a vast number of musical issues across the twentieth century. This article aims to shed a new light on the composer's substantial musical output through his interest in topological theories. It will be a question of showing through examples, the different outcomes of the application of this mathematical model in the musical domain, all the while demonstrating how it takes place within his nexus of influences, as a centre towards which many other of Yuasa's interests converge.

1. INTRODUCTION

The music of Japanese composer Yuasa Jōji 湯浅 譲二 (1929–) finds its own unique place among the large diversity of models it draws on (Galliano 2012). From *nō* theatre to the music of Webern, touching topology, the philosophy of Jean-Paul Sartre, the Zen Buddhism of Suzuki Daisetsu 鈴木 大拙 (1870–1966), as well as the works of Alexander Calder, Paul Klee and his personal friend, engraver Komai Tetsurō 駒井 哲郎 (1920–76), the music of Yuasa explores certain correspondences between ways of thinking from different disciplines and cultures. As Yuasa himself writes on the subject of science and art: ‘It is not exaggerated to say that almost all scientific thought and disciplines (mathematics, physics, and medical science, for example) cast their “shadows” onto art. Art certainly invites its recipients to a wonderland which goes far beyond daily life, but at the same time appears as a total reflection of man’s cosmology’ (Yuasa 1983: 182). This nexus of influences, or ‘cosmology’, passing between the universal and the local (in this case, the Japanese tradition), is an aspect that makes the artist’s works highly relevant to his time. Here we witness a composer entirely conscious of the evolution of his technological and cultural environment, an artist anticipative of the advances in human thinking. Yet this plurality of models, if illustrative of the genesis of his work, is not an end in itself. Moreover, it takes on a sense

according to a larger dual-research: on the one hand, space in music – or the relationship between sound and image – and on the other hand, time.

In light of this, the topological model gives us a useful lens through which we can comprehensively tackle the artistic thought behind Yuasa’s oeuvre. Ever since his early experiences as an artist, Yuasa himself has taken the central role in the development of his musical language, in that it remains to him alone to attempt to answer the two major questions of space and time in music. This could be considered as a centre towards which many other of the aforementioned models converge. As we will see, this influence is found at numerous levels: at a conceptual level by placing in perspective certain topological principles with the concepts of Sartre, as well as at a more pragmatic level, regarding the inner facets of his musical composition, according to which he formalises many questions relating to form and to the constituent parameters of sound itself. While originally applied to instrumental music, topology will above all be relevant in the context of electronic music. It finds its strong musical equivalent in the techniques of filtering white noise, used by Yuasa since the 1960s – most notably in his two pieces: *Projection Esemplastic for White Noise* (1964) and *Icon on the Source of White Noise* (1967).

The use of the topological model in both instrumental and electronic music domains indirectly poses a question of *medium*, with regard to its possibilities and limits in the face of the same question concerning space and time. This also illustrates, to a certain extent, the importance of the implications of one over the other (Yuasa 1974a). As with many composers of his time, the encounter with electronic music radically transforms the relationship of Yuasa to sound itself, that is, the departure from traditional Western notation to the advantages of graphic notation and the push towards experimentation with new technologies. The influence of topology, an idea already cited by the composer himself in regard to his instrumental music (Yuasa 1989: 223–6), will now come to the forefront in an examination of the composer’s electronic music output. In particular, I will be focusing on the two works mentioned earlier on which our investigation

will primarily be based. But before exploring these inner concepts, we will commence by situating the idea of topology within the evolution of Yuasa's musical language.

2. GENEALOGY OF MUSICAL THOUGHT

It was in the early 1950s when Yuasa first encountered topology, notably through the popular science book by Tōyama Hiraku 遠山 啓, *mugen to renzoku* (無限と連続 *Infinity and Continuity*) (Tōyama 1952). Topology, the geometry of continuous transformations, connects two of Yuasa's previous musical preoccupations: on the one hand, it is a way of apprehending the plasticity of sound, and on the other hand, it converges with his research into a new experience of time through the idea of 'projection'. We begin by discussing the idea of plasticity, specifically in the relationship between sound and image, in his compositional process.

2.1. The sound/image relationship, or the birth of an intermedia approach

This form of thinking – foremostly of intermedia – appears very early in Yuasa's artistic practice. In the 1950s, he involved himself in the group Jikken Kōbō (実験工房 Experimental Workshop) along with other composers such as Takemitsu Tōru 武満 徹 (1930–96) and visual artists such as Yamaguchi Katsuhiko 山口 勝弘 (1928–2018), Kitadai Shōzō 北代 省三 (1921–2003) and Komai Tetsurō. Together, they experimented with new artistic formats, collaborating between theatre directors, dancers, poets, photographers, filmmakers and others. Beyond his discovery of the Western musical avant-garde, Yuasa also became intimate with the works of Alexander Calder, Paul Klee and László Moholy-Nagy. These were the influences that would eventually lead him to developing a kind of comparative thinking between visual and sonic art. Of particular significance were his early encounters with Komai: in 1953, Yuasa and Komai collaborated on a multimedia project, using an audiovisual device called an *autoslide*, which permitted synchronisation between magnetic tape and the slides of a projector. On this occasion, Yuasa wrote a score for flute and piano, of which he recorded before then re-recording back onto the tape in reverse. The piece, titled *Lespugue*,¹ is one of the first Japanese works to explore the possibilities presented by magnetic tape. Although rudimentary, this work marks the start of the artist's exploration of the relationships between image and sound.

¹The piece takes as its subject the collection of poems *Lespugue* (1940) by the Venezuelan poet Robert Ganzo (1898–1995).

Even more profoundly than this collaboration per se, it is the work of Komai itself that was to truly influence Yuasa. Himself an enthusiast of music, and fascinated by the works of Paul Klee, Komai produced a series of engraving works in the 1950s that explore a relationship between visual art and music. Yuasa discovered certain principles in this work around spatial organisation that parallel processes found in music. He writes the following on a series of engravings titled *muyūbyōsha no fugue* (夢遊病者のフーガ *The Fugue of the Sleepwalker*): 'I was able to sense that the process by which the images are formed and dismantled was similarly replaced on the horizontal axis of time. This uniqueness of plastic forms resonated deeply' (Yuasa 1974b:12).² Later, Yuasa came to draw a strong connection between the works of Komai and the music of Webern, notably in his engraving *yoru no mori* (夜の森 *Forest of the Night*): 'In *yoru no mori*, as in the music of Anton Webern that I liked at the time, this tension which connects the few chosen sounds is anchored in a space, in perspective, which becomes a cosmos itself' (ibid.).³

These influences stimulated a highly original thinking that would nourish his output throughout his life – primarily, this search for an understanding between time and space. For Yuasa, these two notions respond to each other, and could even be seen as inseparably entwined. As he writes, overall, this association is interdependent/conditional of the existence of even all artistic thought itself:

As we already know, the fact that man has acquired language is one of his characteristic identities. The ability to make signs, as well as to convert the temporal to a spatial diagram, might have differentiated the human being for instance from the apes. As mentioned in the beginning, this particular function is related to art as a mental operation; art cannot exist without it. (Yuasa 1983: 181)

The use of topological principles for apprehending sound phenomena clearly underlies a conceptual indifference; or at least it is this mental process of translation between the sonic and the visual – and by extension, time and space – to which Yuasa is referring. And so, sound phenomena can be represented according to a three-dimensional space, with vertical axis for pitch, horizontal axis for duration, and depth axis for timbral variations and dynamics:

It is clear that musical works have temporal structures; they also involve spatial elements (distances) because they

²Translated by the author: 「イメージが形成されたり解体されたりするプロセスを、そのまま時間軸上に置き換えて感じるものが、私には出来た。そして、そのプラスチックなフォームのユニークさに私は深く共振したのであった。」

³Translated by the author: 「<夜の森>には、私が当時好きだったアントン・ウーベールの音楽のように、選び抜かれた少ない音と音とを結ぶテンションと、それを繋留しているパースペクティブな空間があり、それが宇宙そのものになっていた。」

are structured. In other words, music attributes his nature to an association of ideas which occurs essentially as temporal phenomena; at the same time, it contains this notion of spatiality. For instance, a pitch relationship determines a space which is vertically manifest and a duration determines a space which is horizontally manifest. The light and shade of timbre, density and illusory localization can also be spatially perceived. (Yuasa, 1983: 180)

With these considerations, as well as his experience in electronic music, Yuasa pushed himself away, at least partially, from traditional musical representation in favour of graphic notation (Yuasa 1974a: 60–2). In 1961, he composed *Projection Esemplastic for Piano*, his first work using a kind of diagrammatic notation. The term ‘esemplastic’ refers back to the way in which an artist uses images, words and emotions derived from various domains of human activity and thought, and unifies them within a single work.⁴ This is such that the ‘esemplastic’ abilities of a work could be defined by their capacity to create relationships between constituent elements, to make the whole become one, to make ‘the individual forms come together in order to create meaning’ (Yuasa 1974b: 12).⁵ As we will see, through the symbolic representation of sound, in particular the diagrammatic representation adopted, Yuasa enters into the work in a way that permits us to visualise these relationships in the instantaneity, through which its uniqueness is manifested. Later on, this transition to graphical representation was to become almost systematic in his compositional process, as seen in the vast majority of his large-scale works since the 1970s (Mizuyama 2007).

2.2. Time and its perception: Sartre, or the unpredictable visit of the present

One of the other great obsessions that spans the works of Yuasa is that of time – or rather, the subjective perception of time through the experience of sound. Throughout the 1950s, the composer encountered the philosophy of Sartre, notably through his critique on *The Sound and the Fury* by William Faulkner (Sartre 1939; Faulkner 1929). Sartre’s ideas were to deeply influence Yuasa, this time shaping his view of the instantaneous moment, of uncertainty. For him, this ‘unexpected visit of the present’ resounds strongly with the music of Webern, the temporality of *nō* theatre – of which he had intimate familiarity since his childhood, or even the unpredictable motion

of Calder’s mobiles. Yuasa’s intention was to create a continuously evolving music that offers a subjective experience of time. The word ‘projection’, one that we find in a number of the titles of his works, once again returns us directly to the ideas of Sartre and his notions of the ‘project’ or the ‘pour-soi’ (‘being-for-itself’) (as with the perpetual fleeing from being faced with the ‘en-soi’ (‘being-in-itself’), the past). This is the idea that the listener has an active listening, to being in this Sartrian present – which is to say, to project oneself continuously into the sound, or to again have the perpetual choice of believing in a certain possible future. Yuasa also refers to the ‘stream of consciousness’ (Yuasa 1989: 221–2), a term used to describe the literary style of Faulkner, among others, and which returns to the temporality of the inner monologue, simulated in the thought process of writing.

These aspects were to formalise in his language, in part through the topological principle of continuous transformation, unlocking a new understanding of musical time as a flexible form under perpetual alteration, one possible to stretch or to compress. This elasticity of time permitted Yuasa to liberate himself from regular pulse (we also find a symbolic equivalence in the ideas of Faulkner when one of his characters attempts to break his watch). Thus, Yuasa takes from this idea, imagining topological spaces of ‘temporal reference frames’, being that each takes their own pulse. We also note here that this idea finds its origin in his experience of *nō*. In the last movement of *Projection for Seven Players* (1956), he was inspired by rhythmic patterns used in *nō* that superimpose timeframes of irregular pulsation. The result is a warped variation of the same rhythmic pattern (Yuasa 1989: 220–1).

Thereafter, he continued his exploration of topology in instrumental music, consistently from this Sartrian perspective of the unpredictable present, notably in the two pieces: *Projection Topologic for Piano* (1959) and *Interpenetration for 2 Flutes* (1964). The two pieces function according to the very same principle of temporal reference frames, this time superimposing numerous voices. In *Projection Topologic for Piano*, Yuasa applies his musical materials (principally serial aggregates) on one voice, before implementing them on another. This projection keeps the same number of beats as the original, but undergoes the effects of stretching and contraction due to the changes of timeframe (and thus the changes of the temporal substrate) in which the music is projected. The obtained result is a complex polychronicity and a static, non-directional sense of time – an unpredictability.

In the first movement of *Interpenetration for 2 Flutes*, the polychronicity is taken further by using

⁴The term dates from the beginning of the nineteenth century and is used for the first time by the English poet Samuel Taylor Coleridge (1772–1834).

⁵Translated by the author: 「[...] エセムプラスティックとは、個々の造形が集って来て意味を形成するという意味だ[...]」

distinct tempo curves for each of the two flutes. Whereas in *Projection Topologic for Piano* these timeframes had fixed durations, here the timeframe stretches and contracts to create dynamic musical flow. This attempt, seemingly paradoxical at first glance, consists of combining the idea of the unpredictability in musical flow, conserving a sense of ‘directionality’ on a larger scale. These ideas were repeated in the large-scale works that followed, such as *Chronoplastic for Orchestra (between Stasis and Kinesis)*, composed in 1972. In this work, in the place of tempo curves, Yuasa instead gradually reduces the duration of these timeframes, provoking a progressive augmentation in the occurrence of sonic events, as well as an increase in density of musical flux (Yuasa 1989: 223–5).

From these examples, we understand how the topological model allows Yuasa to realise a Sartrean metaphysics of time as an unpredictable present. We also note here that the notion of topological space is deployed in an abstract form, and is not a constituent of the sonic phenomenon as such. It is a labyrinth of frames, of temporal enclaves, within which evolves the sonic flow, a way of modulating the substrate of time in order to give the illusion of temporal subjectivity. In the case of electronic music, topology will take on yet another reality. Freed from pulsation, Yuasa now directly applies his principles on sound texture. It is no longer a temporal space in which the music will evolve subject to these transformations, but rather the sonic flux itself.

3. THE TOPOLOGICAL MODEL IN ELECTRONIC MUSIC

In an electronic music context, the topological model will above all be deployed in the use of analogue bandpass filters, and through the possibility of sculpting spaces directly in a continuous manner through the sonic texture. We start here by recalling the fundamentals of topology: the study of spatial distortions through continuous transformation. According to a topological perspective, two finite spaces of different shapes are conceptually undifferentiated if one can reconstitute said ‘continuous’ transformations – that is to say, without ripping, or reattaching their structures. This idea of continuity is realised through the technology of analogue filtering, which is well suited to this *medium*.

3.1. *Projection Esemplastic for White Noise*

The first use of filtering techniques by Yuasa dates back to 1964 with his piece *Projection Esemplastic for White Noise*, produced at the celebrated NHK electronic music studio. Yuasa uses one source of

white noise, which he sculpts with bandpass and multiband filter banks. The aim here is to create a dynamic polyphony within the sonic texture by varying frequency position and bandwidth. In addition, he mixes variations in playback speed and intensity, as to further stimulate the sense of movement in the sound. The piece draws inspiration from the Buddhist precept, *isshokuta, tasunawachiichi* (一即多多即一), which one could translate as ‘one is multiple, and multiple are one’ or rather ‘one contains all/infinity, all/infinity is contained in the one’; equally the term *esemplastic*, which, as we have already seen, refers directly to this. Finally, the use of white noise, a sonic texture containing all possible frequencies, returns us again to this very same idea.

According to a topological perspective, we can conceptualise two movements unfolding in the music in two different senses of time. The first is deployed in real, continuous time; it is possible to consider the spaces created through filtration as topological spaces, of which the limits vary in function with time, thus creating a polyphony of movements, or ‘evolving spaces’ in the sound. Concerning the second kind of movement, this is deployed in discrete, imaginary time. This really takes shape in the instantaneity of the graphic score, and implies a new reading of the piece to somehow reveal its ‘esemplastic’ potential. This consists of establishing a morphological classification of different spaces according to topological criteria (i.e., whether they can become one or the other according to principles of continuous transformation). Thus, topological spaces whose forms are related can be considered as many projections of a single and very same fluctuating space, and of which the movement unfolds in a framework of conceptual time different from the ongoing time. The procedure is not without a strong resemblance to that of chronophotography: that which we perceive as independently evolving spaces are in fact projections of the decomposition of movement in another space.

This underlying movement, even if not perceived aurally as ‘movement’, nevertheless acts as an element that structures the piece, in the sense that it creates a new system of organisation of material according to a topological logic. We note that this organisation, even if it achieves a sonic reality (i.e., if it is possible to a certain extent to identify on listening, the different projections of the same space), could not be created by way of this mental process of translation from sound to visual. It is this all-pervasive dialectic between image and sound that permits Yuasa to consider movement according to its plasticity, and to organise it. This conceptualisation of space opened by the audio filters, as fragmented projections of a single fluctuating space outside of time, is not

activated unless we consider the piece in some instantaneity, in the immobility of its graphical representation.

For Yuasa, this underlying time is in fact intrinsic to the musical experience in general, and is not simply unique to his works:

Since each individual moment of the melody, harmony, or dynamic is related to the syntax (the principles behind the writing), music possesses not only a currently ongoing time, but also an imaginative time which constitutes an aggregate of various elements and is a function which the listener must bring forth. These notions of times are abstract onto a spatial axis. (Yuasa 1983: 180–1)

The usage of white noise is a very abstract and rough approach; it is a way for the composer to go to the very essence of musical experience, exploring the ground zero of this musical syntax. The music in its most primary form is but a flow constituent of the movements of sound space: ‘What is perceived in music is not sound, but an illusion emerging from the transformation of movements through time and space.’ (ibid.: 179) We take note here that this underlying time is, in a certain way, closely related to this same Sartrian thinking in the sense that he incites a specific reading of conventional time. In this reading of time the past takes on meaning, and continually reinvents itself through the present, the becoming of the musical material. The nature of this material, in its ‘en-soi’, is continually reinvented through its new *projections*.

3.2. *Icon on the Source of White Noise*

Following on, Yuasa continued these experiments filtering white noise, exploring further topological themes in *Icon on the Source of White Noise*.⁶ This piece was composed in 1967, shortly after Karlheinz Stockhausen’s *Telemusik* (1966), and utilises the same six-track tape machine. Here the complexity of polyphony supersedes that of his previous *Projection Esemplastic for White Noise*, extending the texture up to five contrapuntal voices. Yuasa recorded his sounds on blank tape, pre-cut in advance, in a way to create rhythmic effects (notably in the opening moments of the work); the spaces having more abrupt forms, and thus mixing with the rounded edges of the filter movements, with the clean and straight line of the cuts in the tape (Yuasa 1974a: 58–9). For the most part, the shapes of these spaces are more easily identifiable, and facilitate an easier grasping of the projection of topological spaces. Yuasa returns here

⁶The term *Icon* refers here to the works of the English historian Herbert Read (1955), *Icon and Idea*. Herbert Read explains here the function of art in the development of human conscience. For this, he bases his argument on the first manifestations of art from prehistoric times. He supports the thesis that the image precedes the idea, which is to say, the conscience.

to the works of Komai and to his *Fugue of the Sleepwalker*, which had so much struck him at the time, drawing out the forms of its spaces into his composition.

Beyond those of the filtering techniques in the texture, Yuasa deploys a system of spatialising using five audio channels, and diffusing with five loudspeakers arranged in the form of a pentagon. The piece thus explores different combinations of movements between the five input channels and the five loudspeakers, opening up a multitude of possible sonic trajectories. Here Yuasa takes advantage of the highly perceptible sense of spatial directionality with white noise. He also experiments with rotational movements and the phenomena of phase cancellation between certain sound sources – of which the frequency content is identical or very close, giving the impression of movement out from the centre towards the sides of the speaker arrangement (Yuasa 1973: 194–202). The spatialisation of sound is considered here as one of the principal parameters of the composition. As we can see in the lower part of the graphic score, the notation achieves an extremely sophisticated kind of musical organisation. In *Icon on the Source of White Noise*, the movement is chosen for its ability to create an environment in which the listening takes place. Topological spaces therefore acquire a new dimension in deploying their movements, not only in the sonic texture, such as in *Projection Esemplastic for White Noise*, but also in the performance space itself.

For Yuasa, the idea of immersion, above all, takes its meaning through that of theatre as a primary form of total kinesthetic/artistic experience and of his desire that the audience participate more intensely: ‘It seems that a *soundscape*, an entirely out-of-the-ordinary and unrealistic world, makes its appearance through the planned display and reproduction of multiple sound-source functions. One has indeed made a qualitative advance by adding to the traditional, more delimited spaces such as the studio or theater, a new kinetic space created only by sounds’ (Yuasa 1973: 202) A few years later in 1970, during the Ōsaka World’s Fair, Yuasa collaborated in the project ‘Space Projection, AKO’, produced by filmmaker Matsumoto Toshio 松本 俊夫 (1932–2017) and installed in the grand sphere of the Pavilion Textiles. An audiovisual installation combining video projections and sound, the work used 58 loudspeakers arranged over seven vertical levels. The uniquely horizontal movements of sound in *Icon on the Source of White Noise* now vastly extended their potential with the introduction of a vertical axis. Later on again, in 1988, Yuasa produced the mixed work *Nine Levels for Zeami* at IRCAM in Paris. This work was to be the culmination of all his previous experiences in electronic music. After his formative experimentation using filtering techniques on white

noise, he applied himself approaching his new electronic music with poetic elements, combining it with the world of *nō* theatre. Contrary to his works of the 1960s, produced with analogue equipment, *Nine Levels for Zeami* utilises computer technologies, allowing a much finer control of filters, and also a new experimentation with the voice, thanks to the phase vocoder developed at IRCAM in the preceding years.

4. CONCLUSION

Topology enabled Yuasa to connect some of the major themes he was otherwise developing through his music. In the first instance, it unifies an approach that considers the plasticity of sound with a philosophy of time and the perception of time, implicating the first conditionally on the second. It is through this sound/image relationship, induced by a topological approach of musical movement, that Yuasa formalises his principle of ‘projection’ and its temporal ideal, the ‘unpredictable present’. Then, exploiting systems of spatialisation with loudspeaker configurations, topology finally finds its ultimate place in this idea of sound environment and kinetic space, permitting a heightened sensory experience for the listener. This last point in fact reveals the true goal of all his research on sound: ‘One is forced, here, to speculate about the essential meaning of music, to decide whether music actually stands for the expression of man’s sensations or emotion or rather sets up a situation within which sensations and emotive responses are elicited from the listener’ (Yuasa 1989: 226). This mental process of translation from sound to image, as well as

this temporal subjectivity and environmental approach, all find their finality in this idea of active listening, of the heightened participation in the part of the listener.

REFERENCES

- Faulkner, W. 1929. *The Sound and the Fury*. New York: Random House.
- Galliano, L. 2012. *The Music of Jōji Yuasa*. Newcastle upon Tyne: Cambridge Scholars Publishing.
- Mizuyama, T. (ed.) 2007. *Yuasa Joji ni yoru Yuasa Jōji ten* (Yuasa Joji による湯浅譲二展 *Yuasa Joji by Yuasa Jōji*). Koriyama: Koriyama City Museum of Art.
- Read, H. 1955. *Icon and Idea. The Function of Art in the Development of Human Consciousness*. New York: Schocken Books.
- Sartre, J.-P. 1939. À propos de *Le Bruit et la Fureur*. La temporalité chez Faulkner. In A. Elkaïm-Sartre (ed.) *Situations I. February 1938–September 1944*. Paris: Gallimard, 2010, 65–75.
- Tōyama, H. 1952. *mugen to renzoku* (無限と連続 *Infinity and Continuity*). Tokyo: Iwanami Shoten.
- Yuasa, J. 1973. Theater as an Environmental Medium. *Perspectives of New Music* 31(2): 192–209.
- Yuasa, J. 1974a. The Shadow of Tape Music on Instrumental Music. *Contemporary Music Review* 1: 53–74.
- Yuasa, J. 1974b. Komai-san to watashi (駒井さんと私 Komai et moi). *Print Art* 17(8): 11–13.
- Yuasa, J. 1983. Mind in Art. *Perspectives of New Music* 31(2): 178–85.
- Yuasa, J. 1989. Temporality and I: From the Composer’s Workshop. *Perspectives of New Music* 31(2): 216–28.