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## **From Tone Inflection to Microdimensional Glissando: Observations on Microtonal Manner in Contemporary Lithuanian Music<sup>1</sup>**

### **1 Introduction**

“Why the interest in new tunings?” Thus Douglas Keislar introduced the Microtonality Today forum in 1991.<sup>2</sup> Yet the same question may be applied to the beginning of the twentieth century when intense changes in the cultural panorama – as well as in music – were occurring.

The first decades of the twentieth century were marked with an aspiration for recommencement in the arts. That was influenced, in particular, by a burst of technological innovation. Changes to the external world, especially the glorification of technology, fostered a rebellious and even negative reaction against remnants of romanticism and sharpened the gap between the circulating modern outlook and rooted cultural values. A revolt against the past revealed itself in an admiration for reality and objectivity that renounced and replaced the exaltation of the inner world and emotions.

The vivid juxtaposition of two centenaries caused the settlement of new artefacts, which had an influence in the creation of music as well. We can mention the rise of the futurist wave, which addressed the desire to reorganize nature, sought to discard the art of the past, and even glorified violence (e.g. encouragement destroy museums). In 1911 Francesco Balilla Pratella, the author of *La Musica Futurista. Manifesto tecnico*, was calling for the link of music to everyday sounds. As Diana Keppler (2001) pointed out, the idea of the liberation of the music/composer, raised by Pratella, encouraged composers to refuse the traditional rhythmic arrangement, genres, and forms of music as well as the conventional perception of tonality, consonance, and dissonance.

Furthermore, the surge of recording techniques was followed by the appearance of machinist aesthetics. The formalization of nature seemed to be a general

1 The chapter was written as the part of the project “Sound Utopias: Cultural Impulses and Institutional Contexts of Lithuanian Music (Trans)avant-garde”, funded by the Research Council of Lithuania (LMTLT), agreement No S-LIP-18-39.

2 The question cited from Keislar’s introductory text (Keislar 1991a, 174) in a special chapter “Forum: Microtonality Today (Part One)” of *Perspectives of New Music* journal. The chapter is of great interest and consists of four texts: introduction by Keislar (Keislar 1991a) as well as Keislar’s interview with six American composers (Keislar 1991b), Hesse’s text on ekmelic music (Hesse 1991) and an essay by Ezra Sims (Sims 1991).

aspiration, in parallel to futurist intentions: machinist composers deliberately eliminated the elements of nature and landscape, replacing them with urban and technological artefacts.<sup>3</sup> Moreover, the recording technologies extended the horizons for sound analysis, transformation and distortion, and decomposition and synthesis and produced a new quality of timbres, stimulating the emergence of electroacoustic and electronic music. To assess the development of machinist music in the middle of the twentieth century, Christopher Hailey pointed out:

The aesthetic of machine heralded by the prewar Futurists had become a reality: the motoric, metallic, percussive qualities of post-war music seemed to mimic life's accelerated tempo, its spirited commerce, heavy industry, mass transit systems, and swelling urban populations. (Hailey 1994, 16)

Here I would add a remark by Hermann Danuser (1984, 100), which states that the emancipation of noise became an essential part of the history of twentieth-century music.

It seems that microtonal experiments appeared to consciously control and functionalize natural phenomena (cf. attempts by futurists and machinists). In the beginning of the twentieth century, microtonality started to manifest simultaneously to the prevailing employment of the artificial chromatic scale, a row of 12 semitones in the octave.<sup>4</sup> Actually, the consensus of equal temperament was a result of the sequential process in music that had taken place since the sixteenth and seventeenth centuries. However, the established 12-TET quickly began to reflect "exhaustion" and "tiredness". As Arnold Schoenberg commented on the processes in the nineteenth century:

Richard Wagner's harmony had promoted a change in the logic and constructive power of harmony [...] a development which ended in what I call the emancipation of the dissonance.<sup>5</sup>

Later, such flourishing outcomes of 12-TET, like serial thinking and Schoenberg's technique of dodecaphony, encountered the limitations encoded in their inner structure.<sup>6</sup>

3 However, the language of machinist music couldn't escape the manner of imitation of, e.g. the motion of locomotive or rhythmic rail wheel sound (e.g. in Ernst Křenek's *Ballad of the Railroads*, Op. 98, one may find a reference "illustratively" for performers).

4 The twelve-tone equal temperament (12-TET, also 12-EDO/equal division of the octave), where the adjacent notes produce the same ratio, i.e. the distance between any adjacent semitones is equal to 100 cents.

5 Cited from Schoenberg's essay repeatedly published in 1984 in English as "Composition with Twelve Tones" (in *Style and Idea*, edited by Leonard Stein, 216. London: Faber & Faber).

6 As Ben Johnston has argued in his articles, serialism and indeterminacy were "natural outcomes of the exhausted pitch structure bequeathed by equal temperament" (Granade 2007, 297), as a composer

The increased attempts in microtonal music contributed to the transformation and even rejection of the 12-tone temperament as well, signifying the rediscovery of just intonation. Composers started to look for the expansion of an equal temperament to create new sonorities, a diversity in tone relationships, and realizable chords. Among the first attempts to compose music, we might identify Richard Stein's *Zwei Konzertstücke* with quarter-tones for cello and piano, Op. 26 (1906), which are reputed to be the first published quarter-tone music; the quarter-tone opera *La Rosiera* by Vittorio Gnechi in 1910; and the chrestomathic case by Charles Ives, *Three Quarter-Tone Pieces* (1904–1924).<sup>7</sup>

himself he was involved in neoclassicism and serialism; however, quite soon Johnston abandoned the serial technique and turned towards just intonation, fascinated with Harry Partch's ideas.

7 However, as early as in the nineteenth century we may notice some signs of increasing dissatisfaction with limited possibilities of Western major-minor system, the turn of music processes towards abandonment of form and melody, and the revision and extension of diatonics, e.g. the use of non-tempered scales and microintervals. It is stated that Heinrich Richter wrote on quarter-tone music in his *Aphorismen* as early as in 1823. Among tentative examples are the String Quartet in quarter-tones by John Herbert Foulds composed in 1898 or an earlier case from 1849: to simulate the enharmonic sound of ancient Greek Oceanides Fromental Halévy invoked some sporadic quarter-tones in the strings of Prométhée enchaîné. Moreover, let's recall some historical background, e.g. a source of special significance, Abraham Bartolus's treatise *Musica mathematica* (1614), which presented Andreas Reinhard's division of Phrygian scale into 48 equal parts as an analogue of cosmic proportions. Some vivid examples reach us from the Renaissance period, when Vicentino experimented with microtonal archicembalo with 31 keys in the octave in 1555 (the idea later developed by Christian Huygens), or Francisco de Salinas in his treatise *De Musica* (1577) described the 19-tone scale in the meantone tuning. It is stated that Christian Huygens experimented with 31 tone, while the division of octave into equal thirds of a tone (19-tone scale) was implemented practically by composers Guillaume Costeley, Jean Titelouze.

Meanwhile, returning to the nineteenth century, let me highlight two more facts remarkable in the context of the period, celebrating the apogee of the major-minor system. The first is the recollection of the centuries-old idea of nineteen-tone equal temperament – in 1835 Wesley Woolhouse in his study on music intervals was engaged to approximate the diatonic scale stating that “enharmonic scale of 19 sounds in the octave would furnish a very accurate diatonic series on each of them as a key-note” (Woolhouse 1835, 68). Incidentally, a century later this idea was raised again by musicologist Joseph Yasser when he defended his hypothesis on “evolving tonality”. In a 1929 article Yasser expressed a prevision of 12-tone development into the division in 19 equal parts as sequential and logical because the 12-tone system was derived from diatonics, i.e. a 7-tone scale that was a result of pentatonic (for more, see Yasser 1929; also Berry & Solkema 2014).

The second fact from the period of Romanticism, a text by German composer, music teacher and writer Johanna Kinkel, is of great interest because of her insights on the purely tonal sound-world by Chopin. In her essay from 1852, the 8th letter “Notes on Piano Literature”, one may find the germ of the idea on the liberation of sound, an emotional plea for microtones: speaking about the flow of the melody in Chopin's piano music, Kinkel calls for the emancipation of quarter-tones, regretting that the “clumsy” semitone scale is insufficient to express the tiny relief of a composer's melody, because the music in its nature is “the infinite scale decomposed into sound atoms”. Here are the original text in German from the “Notes on Piano Literature” [Anmerkungen zur Klavierliteratur] (Kinkel 1852, 76, 78–9):

“Chopin will die Vierteltöne erlösen”;

“seine Melodien schleichen widerstrebend durch die halben Töne, als tasteten sie nach feinern, vergeistigtern Nüancen, als die vorhandenen feinen Intentionen bieten”;

and further: “unsere sogenannten ganzen und halben Töne zu plump und lückenhaft auseinander liegen, während die Natur nicht bloß Viertel- und Achteltöne, sondern die unendliche, kaum in Klang-Atome zersetzte Skala besitzt!”

It is very likely that Kinkel might have had in mind Chopin's pieces, like the rapidly ascending and descending chromatic passages in the Etude #2, Op. 10 or the false-like harmony created by semitone E minor Etude #5 from Op. 25.

From the 1920s, increasing interest was shown in microtonal composition.<sup>8</sup> At this time, various forms of critical writing around musical modernism appeared as well. As early as in 1892 Georg August Behrens-Senegalden published a text describing his designed and patented quarter-tone piano. Almost at the same time, in 1895 Julián Carrillo started to explore microtonal intervals on the violin and elaborate the 13<sup>th</sup> sound theory<sup>9</sup> (yet, only in 1922, in *Preludio a Colón* for ensemble, were Carrillo's experimental intentions carried out for the first time).<sup>10</sup>

It's worth pointing out a progressive idea based on the sixth-tones that was described by Ferruccio Busoni in his 1907 essay on new music aesthetics published in Germany. In his seminal work Busoni offered pros and cons of giving up semitones for tripartite tones and presented two models of third-tone series from C and C-sharp (Busoni 1911, 31–3) (see Example 1).<sup>11</sup> A German auditorium was introduced to another proposal a decade later when, in 1917 the German composer Willi Möllendorff set out his theoretical and practical insights on quarter-tones and microtonal harmonium. In his pamphlet, Möllendorff elaborated his idea of bichromatic music and presented propositions for notation and chord combinations as well as a discussion on the choice of suitable sonorities (Möllendorff 1917) (see Example 2).

It was at the same time that Charles Ives, probably the composer most often cited who believed in the future of microtonal sound, envisioned potential

8 Not to overlook the fully devoted oeuvre by Julián Carrillo, Alois Hába's consistent creation, including the 1927 study *Neue Harmonielehre*, Ivan Wyschnegradsky's musical experiments and the publication of his Manual in 1932 as well as bringing together a Circle of quarter-tone music enthusiasts led by Georgy Rimsky-Korsakov in Russia. Also worth mentioning is the Piano quintet using quarter-tones in strings by Ernest Bloch (1923), *Four Japanese Songs* for soprano and orchestra (1929) by Jan Maklakiewicz with the quarter-tones originating from a Japanese scale, the Concerto for quarter-tone piano and strings by Hans Barth (1930), and others afterwards.

9 Originally *el sonido trece* or *Sonido 13*.

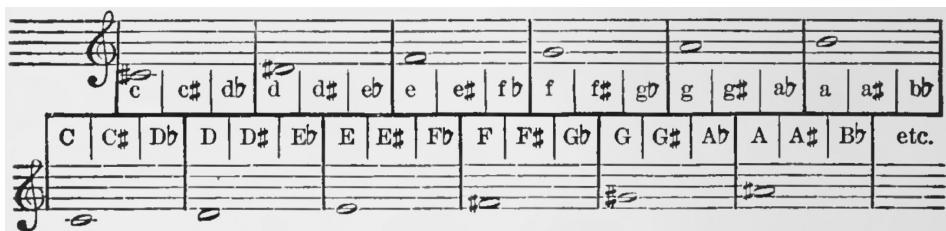
10 Although sporadic experiments with musical instruments date back for several centuries (e.g. in their writings, theoreticians Salinas, Fabio Colonna, Kircher depicted the model of enharmonic keyboard with 24 to 60 keys in the octave; according to Mersenne, Titelouze had a harpsichord with 19 equally tuned tones to octave; a well-known archicembalo with 31 keys by Vicentino in 1555, etc.), the interest in microtonal music in the turn of past century revealed itself in the design of new types of instruments further. In 1892 Behrens-Senegalden announced his patented quarter-tone piano, while Stein, after composing his *Zwei Konzertstücke*, constructed keyboard and wind instruments with new chromatic capabilities and a quarter-tone clarinet. Wyschnegradsky was among the fortunate composers to own his personal experimental piano, produced at Förster in the 1920s to perform the composer's predominantly used 24-TET. To recreate the music creation processes a microtonal piano with twelfth-tones (i.e. 97 keys per octave) was designed at Sauter and presented at Brussels Expo 58, world's fair famous for such landmarks as Atomium, the Philips Pavilion or the display of the autograph of Mozart's Requiem.

11 Originally in German as *Entwurf einer neuen Ästhetik der Tonkunst*, Busoni's essay was ridiculed by his peers. However, quite soon, in 1911, it was translated into English and published in New York as the *Sketch of a New Esthetic of Music*.

ways of producing music that were not yet a part of the practice of composing (Ives 1925):

Even in the limited and awkward way of working with quarter-tones at present, transcendent things may be felt ahead – glimpses into further fields of thought and beauty.

In parallel to Ives, his contemporary Ivan Wyschnegradsky (a Paris-based Russian émigré composer called “the most enduringly influential of this first generation of ‘pitch adding’ composers – particularly in Europe” [Werntz 2001–2003]) also emphasized the advantage of the quarter-tone harmony for its possibility to modulate “in the most distant tonalities”; he considered quarter-tones as a “natural and logical extension” of the semitonal system (Wyschnegradsky 1927) and “a central issue in modern music” (Wyschnegradsky 2017, XI).



*Example 1: Two scales with the third-tones from C and C# presented by Ferruccio Busoni in his Sketch of a New Esthetic of Music (Busoni 1911, 32)*

*Example 2: ‘Bichromatic’ notation and possible modulations according to Willi Möllendorff (Möllendorff 1917, 18–9, 23–4)*

From today's perspective, Wyschnegradsky's prescient thoughts, devoted composing practice of Alois Hába and his pupils (the Lithuanian composer Jeronimas Kačinskas among them) as well as manifold experiments by other microtonality advocates did not develop into a leading trend of twentieth-century music composing or firmly rooted network of microtonal communities. This is what Julia Werntz worried about in her 2001 article:

So then why, with so many innovations to point to, hasn't microtonality established itself more solidly in the conscience of the general musical public? [...] this [is] after a century in which so many other musical parameters have been explored and eventually accepted into the new music "establishment": extended instrumental techniques, pantonality, timbre, sampled sound, electronically and computer-generated sound, musical multiculturalism, "non-intentionality," issues of structure and time and even the function of music. Viewed from this angle, changing or adding pitches should seem simple, obvious, even inevitable... (Werntz 2001–2003)

In the last decades of the twentieth century, although it did not represent the most popular trend, microtonality re-experienced a growing interest from composers, which was encouraged, to a large extent, by rapid progress in information technologies. As Keislar pointed out, "computers and microprocessor-controlled instruments have alleviated the problem of performance difficulty" (Keislar 1991a, 174). Aesthetic flexibility was another factor in the revival of microtonality because "nonstandard tunings offer a means to breathe new life into minimalism" (Ibid.). In addition, I want to mention David Lewin's transformational theory, presented in the early 1980s, about the conceptual space of music. In Lewin's theory, intervals could be measured with a mathematical group system and musical space occupied three dimensions – pitch, rhythm, and timbre.<sup>12</sup> Here a remark by Hugues Dufourt comes to mind, which states that in the last decades of the twentieth century, the musical/sound space was perceived as "an element of new sound plastic".<sup>13</sup> So for microtonality's revival, no less influential was

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12 In 1987 David Lewin published a solid volume on transformational theory, *Generalized Musical Intervals and Transformations* (New Haven, CT, and London: Yale University Press).

13 Dufourt's quotation comes from his book *Musique, pouvoir, écriture* (1991, 279; cited from: GRUODYTĖ, Vita. 2013. "Kvėpuojanti Justės Janulytės muzika" [Breathing Music by Justė Janulytė]. *Kultūros barai* 9: 38). In his book Dufourt captured the rich contexts and music aesthetics of Paris group L'Itinéraire (also represented by Tristan Murail, Roger Tessier, Gérard Grisey, Michaël Levinas), later labeled as

the emerging fascination in timbre and the search for new timbral qualities that resulted in an especially refined trend for contemporary music – the phenomenon of spectralism.

## 2 Systematizing microtonality

The characterization of microtonal music/composing with microtones remains under consideration. Today, the description of non-12-tone music is reflected in different concepts and attempts to systematize it because, first, of highly individualized technological as well as each composer's aesthetic attitude and, second, of the diversity in application of different tunings based on such aspects as microtonal relationships, different divisions, and acoustical properties of the harmonic series. Yet, as Navid Bargrizzly has noted, "these different systems have one characteristic in common: they all reject the dominance of twelve-tone equal temperament and attempt to break through its limited, monolithic scope".<sup>14</sup> In this section I try to collect and discuss cases of the microtone phenomenon in order to highlight and systematize the important features of microtonal music composition.

### 2.1 Of the term and connotations

In general, the diversity of descriptions is typical of naming the microtone phenomena itself. For example, according to Lydia Ayers's listing in her 1994 thesis, we find several alternatives to cover the term "microtonal" (Pertout 2007, 1):<sup>15</sup>

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spectralism. Yet the idea of sound plasticity was soaring in the atmosphere more broadly, e.g. at a time Horatiu Rădulescu raised his idea of sound plasma, publishing a fascinating prose composition in 1975 (the text itself was completed two years earlier). For example, French composer Pascal Criton, who focused on microtonal harmonies as well, has stated about her 1980s piano pieces that she claimed "to reach molecular material, to fluidify the material of sound" (cited from: DOSSE, François. 2010. Gilles Deleuze and Félix Guattari: *Interesting Lives*, translated by Deborah Glassman, 446, New York: Columbia University Press).

14 Cited from Bargrizzly's description of his seminar on intonations, tunings, scales, and microtonality, [https://www.navidbargrizzly.com/uploads/5/4/8/1/54814981/bargrizzly-syseminar\\_in\\_microtonality\\_tuning\\_and\\_intonation.pdf](https://www.navidbargrizzly.com/uploads/5/4/8/1/54814981/bargrizzly-syseminar_in_microtonality_tuning_and_intonation.pdf) [accessed August 20, 2018].

15 In 2007 Chilean composer Adrián Pertout completed his PhD with the thesis on microtonal music and tuning systems, encompassing the ideas by Lou Harrison, Alain Daniélov, Harry Partch and Ben Johnston as well as describing his utilization of Persian, Indonesian and Japanese musical scales in creating new microtonal works. The listing by Lydia Ayers' is presented in the introduction, where Pertout refers Ayers' DMA thesis *Exploring Microtonal Tunings: A Kaleidoscope of Extended Just Tunings and their Compositional Applications* (University of Illinois, Urbana-Champaign, 1994).

- **tuning**
- **microintervals**
- **macrointervals** or **macrotones**, such as 5-tone, 7-tone, and 10-tone equal temperaments
- **omnitonal**
- **omnisonics**
- **neoharmonic**
- **xenharmonic**
- “exploring the sonic spectrum”
- **non-twelve.**

The latter concept (“non-twelve”) prompts us to add the term **“atwelve-tone”** (“atwelve-tonality”), which in 2001 was proposed by Julia Werntz, an American composer and musicologist and a representative of the Boston Microtonal Society, in order to generalize the harmonies mismatching the 12-tone model (Werntz 2001, 189–90). As we may see, in fact both Ayers’s listing and Werntz’s term focus on certain ways and types of operating with the sound/pitch/interval and show the broadness of the phenomenon in basic opposition to the “twelve-tone”. For example, taking into account the range of octave, “atwelve-tone” refers any quantity of tones that is different to 12, either more or less. Moreover, the adjacent tones may relate either in same/equal or different ratio.

Furthermore, the provided listing should include some earlier dated references such as:

- **“quarter-tone”** (as common as “microtone”), which theoreticians used as early as the seventeenth and eighteenth centuries to explain the ratio between enharmonic diesis and flat.
- **“achromatic”** was chosen by Behrens-Senegalden to explain his quarter-tone experiments with instruments in 1892.
- the above-mentioned **“bichromatic”** used by Willi Möllendorff in his 1917 text,
- and Wyschnegradsky’s visionary idea of **“ultrachromatics”** from the 1920s that brings together several interrelating micro-dimensions, and thus the microintervallic domain becomes inseparable without the micro-rhythmic and micro-durational techniques.

The consideration on microtonality gives another way to discuss when dealing with the concepts of “consonance”, “dissonance”, and “tonality” and their variation in a long-lived Western culture. For example, advocating for pure sound, composer David B. Doty rejects equal tuning, because “if you want a perfect

fifth, use a 3:2, not a 32:21 or a 40:27 [...]; if you want a major triad, tune it 4:5:6 [...] that would be impossible in 12-tone equal temperament, where all of the supposed consonances other than the octave are, to varying degrees, dissonant" (Doty 2003). Werntz holds the same position as she indicates the pure intervals consonant, too (Werntz 2001, 161). Moreover, in his 80<sup>th</sup> anniversary interview, Hába confessed his music was tonal, albeit microtonal,<sup>16</sup> while Ezra Sims stated that his work is established "squarely in the evolving tonal tradition of Western music", and as Brian Bartling noticed, "focused on expanding musical materials within a tonal framework" (Bartling 2016, iii, 3).<sup>17</sup> But on the contrary, Lithuanian composer and musicologist Antanas Kučinskas has pointed out that Lithuanian composers mainly tend to use microtones in order to avoid/reduce the sense of tonality or tonal sound (Kučinskas 2003, 13). These statements (emphasized with the composer's personal position as well) encourage us to consider microtonality as a sequential extension of established equal temperament in the common practice of Western tonality.<sup>18</sup>

As we may see, the arguments for the most accurate way to characterize the microtonal phenomenon continue to vary. For example, while Ayers advocates for the term "omnitonal" (Pertout 2007, 1), San Diego composer Ivor Darreg exploits the Greek word "xenharmonic"<sup>19</sup> as "especially apt for radically different tunings" (Keisl 1991a, 173). In my study I prefer to use the term "microtonal"<sup>20</sup> as most proper for describing small structures.<sup>21</sup> What's

16 This was said in one of the last interviews with Hába published in Polish musical press, see: KACZYŃSKI, Bogusław. 1973. "Jubileuszowa rozmowa z Aloisem Hábą." *Ruch Muzyczny* 16.

17 As Brian Bartling summarizes, all of Sims' pieces use transpositions of a single scale and a corresponding notational system in 72-TET that, to him, had tonal implications but with an expanded palette (Bartling 2016).

18 In fact, today the conceptual problem of (a)tonality and con/dissonance oversteps the area of microtonality and demands a broad re-assessment in the context of contemporary music panorama. The problem exceeds the subject of this article and is not developed further.

19 Meaning "unfamiliar modes" in Greek.

20 Etymologically "microtone" is a combination of Greek μικρός (*mikrós*, "small") and Latin *tonus* ("sound, tone"), but the Greek τόνος (*tónos*, "strain, tension, pitch") would be a more accurate origin.

21 The definition of microtone, signifying the interval smaller than semitone, is the most common explanation presented in leading music encyclopedias like:

- SIMS, Ezra. 1972. "Microtone." In *Harvard Dictionary of Music*, 2<sup>nd</sup> edition, edited by Willi Apel, 527–28. Cambridge: Harvard University Press: "an interval smaller than a semitone"
- RANDEL, Don Michael. 1999. "Microtone." In *The Harvard Concise Dictionary of Music and Musicians*, 417–18. Harvard University Press: "an interval smaller than a semitone"
- GRIFFITHS, Paul, Mark LINDLEY, and Ioannis ZANNOS. 2001. "Microtone." In *Grove Music Online*, <https://www-oxfordmusiconline-com.ezproxy.lmta.lt/grovemusic/view/10.1093/gmo/9781561592630-e-0000018616> [accessed August 20, 2018]: "any musical interval or difference of pitch distinctly smaller than a semitone"
- BARTHELMES, Barbara. 2016. "Mikrotöne." In *MGG Online*, edited by Laurenz Lütteken. Kassel, Stuttgart, New York, 2016ff, veröffentlicht 2015-07-07, <https://www.mgg-online.com/mgg/stable/13668> [accessed August 20, 2018]: "Die Bezeichnung *Mikroton* bzw. *Mikrotöne* (engl. *microtone*, *microtones*, ital. *microtono*, *microtoni*) steht zunächst als Sammelbegriff für Intervalle, die kleiner sind als ein temperierter Halbtön."

interesting, though, is that according to the authors of the “Microtone” article for *Grove*, “microtone” itself may specify *any* interval that deviates from the familiar 12-semitone scale, even “with *fewer* than 12 pitches” (Griffiths et al. 2001) [italics by R.P.]. On the other hand, for example, based on the criticism by Gieseler, Lithuanian musicologist Gražina Daunoravičienė suggests replacing the use of “microtone” and advocates for the term “Kleinstintervallen” or “microinterval” as more precise (Daunoravičienė-Žuklytė 2016, 320–21).<sup>22</sup> However, microtone remains the most common and general for music intervals smaller than semitone (respectively, the concept “macrotonal”, “macrotone” would be more appropriate for describing structures bigger than semitones).

## 2.2 About the technological approach

It would be accurate to say that the variety in names for the microtone phenomenon reflects the multiplicity of ways microtones are expressed in music texture. Paraphrasing Tristan Murail’s talk on spectral music, we could properly switch his remarks to microtonality, commenting that it is “not a style”, but “a *technological* approach” towards pitch and music composing [italics by R.P.].<sup>23</sup> Even according to the chrestomatic systematization of principles for contemporary music composing by Walter Gieseler, we might classify microtonal composing as a type of musical material organization.<sup>24</sup> Thus, when investigating microtonal music, researchers generally take a look into the technological substance of music and analyze the ways and methods of

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22 The reference is made to Gieseler’s article based on his presentation “Kritische Anmerkungen zur Komposition mit Kleinstintervallen” at the 2<sup>nd</sup> Mikrotöne Symposium in Salzburg in 1987 (in 1988 published in *Mikrotöne II*). Moreover, Daunoravičienė points out a widespread association of *tonus* with the whole tone mainly, i.e. major second composed of two semitones. So according to Daunoravičienė, namely the semitone, *semitonus*, is the starting point for further division into smaller parts, not the whole tone; thus a generalizing concept “microdimension”, “microdimensional music” is more accurate for Lithuanian musicologist (Daunoravičienė-Žuklytė 2016, 321). I have to clarify that in choosing the term microdimension Daunoravičienė mainly refers to the case of Lithuanian composer Mažulis’s oeuvre that is a broad landscape enriched with intersecting various microdimensions from tiny intervals to microscopic durations.

23 In 2005, visiting the Gaida contemporary music festival in Lithuania, Tristan Murail said in an interview (the interview was published in Lithuanian): “Spectralism is by no means a style, nor a trend. It is a pure technological approach to the timbre and process of music composing. Of course, the connection between aesthetics and technique is obvious. [...] There are no universal rules here.” (Mockutė 2005)

24 According to Gieseler, music composing techniques are categorized as a hierarchical model of three levels, which are: (1) music material and its organization, (2) structural organization (e.g. serial technique) and (3) entire form. Organization of music material operates with such parameters as duration, dynamics, timbre as well as pitch (more see GIESELER, Walter. 1975. *Komposition im 20. Jahrhundert*. Celle: Moeck).

octave division as well as certain tools and elaborated types of tuning applied in the piece. However, according to composer Rytis Mažulis, the brightest figure in Lithuanian contemporary music who faithfully deals with microtones in his oeuvre, there are no established rules in microstructural composition yet. Further in this text, I intend to distinguish certain factors that are presented by different scholars and/or composers.

It would be true that the most common is the focus on the **music interval** alongside the **division of the octave**. The division may be represented in different models like various results of equal division as well as historically fixed and artificial **tunings** featuring microtonal relations. For example, in the mid-twentieth century, James Murray Barbour indicated four European “leading tuning systems” – Pythagorean tuning, just intonation, meantone and equal temperaments – which we consider important in discussing microtonality.<sup>25</sup> While for Gardner Read, who attempted to collect the types of microtones in his book on microtonal notation (Read 1990), a starting point is the division of the octave. As a result, Read selected five types of scales:

- 1) the division of the octave into 24 equal intervals with quarter- and three-quarter-tones
- 2) a scale with eighth- and sixteenth-tones, respectively modeling the octave with 48 or 96 intervals
- 3) third-, sixth-, and twelfth-tones, or 18, 36, and 72 equal intervals
- 4) fifth-tones, or 31 equal intervals
- 5) extended and compressed scales with equal as well as different ratios.

Though the list above shows Read’s interest in equal division (points 1 to 4), he was criticized for insufficient attention to non-equal scales.<sup>26</sup> However, Read’s meticulous specification corresponds to numerous results in music

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25 Below listed synopsis of Barbour’s description (Barbour 1948, 20) presents some microtonal insights:

- 1) Pythagorean tuning that according to Barbour is “excellent for melody”, but “unsatisfactory for harmony” and characterized with g-sharp higher than a-flat,
- 2) just intonation, “better for harmony than for melody”, g-sharp lower than a-flat,
- 3) meantone temperament, “a practical substitute for just intonation, with usable triads all equally distorted”, g-sharp lower than a-flat, and
- 4) equal temperament, “good for melody, excellent for chromatic harmony”, g-sharp the same as a-flat.

26 Shortly after its publication, Read’s study was reviewed by Rudolf Rasch (1991. In *Perspectives of New Music* 29, no. 1 (Winter): 258–62) and David B. Doty (1992. In *Notes*, Second Series 48, no. 4 (June): 1309).

I should also note that the first four items indicated by Read are usually put together, i.e. I see no need to separate #1 and #2 for they both focus on the versions of duplex division.

practice.<sup>27</sup> On the opposite end of artificial equal division, some composers get into employing natural scales, creating their own systems based on tuning of just intonation or other tunings, series of overtones, and non-Western harmonies.<sup>28</sup>

The observations above allow me to discuss probably the most general viewpoint regarding the use of microtones that I call a bipartite approach.<sup>29</sup> For example, generalizing the variety in microtonal music categorization in his thesis on microtonal equal temperaments, William Reilly Ayers focuses on two groups of composers who “desire an *expanded* musical palette” and those who look for “an *altered* one” (Ayers 2018, 1). In principle we may rely on Julia Werntz’s proposed “division between composers using just intonation and those choosing to ‘add pitches’ to the usual twelve-tone scale”<sup>30</sup> as well as Frank Denyer’s “distinction between the ‘tuned’ (using justly tuned intervals) and ‘untuned’ (not using justly tuned intervals)” (Ayers 2018, 4).

27 We should start the list of composers employing equal division with Wyschnegradsky, who was passionately occupied with the division of the octave into small, equal parts and predominantly used a division of 24 tones (among others – 18-TET, 36-TET, 72-TET that divide the octave into third-, quarter-, sixth- or eighth-tones). It is worth mentioning the set of etudes by Easley Blackwood that present his research on microtonal tunings and possible equal tunings from 13 to 24 notes to the octave. Ezra Sims was interested in an octave with 72 tones while Mathew Rosenblum, according to Grove, “a leading voice in American microtonal music”, employed both a 12-note equal tempered system and a 19- or 21-note microtonal system in his music.

28 A 43-tone system designed by Partch was based on unequal divisions of the octave, while Ben Johnston in his *Suite for Microtonal Piano* created a 12-tone scale with microtone deviations comparing to the equal intervals. Lou Harrison and Ben Johnston were interested in just intonation due to its natural perfection; Harrison, even more, called the equal temperament intervals “fake” because they can’t be expressed in whole number ratios (Keislar 1991b, 184).

29 I would say that the bipartite approach is quite convenient and common and carries out certain systematizations because it is based on the universal phenomenon – constant opposition as stimulus for the momentum of the universe. Here I would like to demonstrate a parallel to Lithuanian composer and musicologist Kučinskas’s research, who took the principle of dichotomy (or opposition) and proposed a systematization of contemporary music. In this way Kučinskas specified two general directions, the first of which aspires to determination, precision and consistency (e.g. serial music), while the second presents the tendency of approximation (e.g. aleatoric music) (Kučinskas 2003, 11–3). As for Kučinskas’s approach to the category of sound, he points out two qualities: the traditional *tonal* type, i.e. determined and differential sound; and the *sonorous* type, a syncretic and indivisible field/mass of sound without a fixed pitch (e.g. represented by timbral explorations). Namely the latter type, according to Kučinskas, includes microtonal sound. However, Kučinskas’s position (i.e. the perception of microtonal sound as not fixed pitch) needs clarification – basically Kučinskas has in mind only *coloristic* microtones (he discovers this way to employ microtones prevalent in the oeuvre of Lithuanian composers).

30 Julia Werntz’s observation pointing out the creative motives also comes to mind: on the one hand, composers desire pure, i.e. justly tuned sound and/or are fascinated with “exotic” harmonies; on the other hand, they simply add pitches. The latter motive, according to Werntz, is not only rationally based and theoretically clear, but at the same the most artistic and creative approach. Werntz’s ideas were presented in her PhD thesis *Toward an Understanding of Expanded Equal Temperament* (Brandeis University, 2000) as well as in subsequent articles (e.g. Werntz 2001 & 2001–2003).

To this model I would add Georg Friedrich Haas's distinction between *evenly* and *unevenly* structured music scales.<sup>31</sup>

### 2.3 Werntz and Haas's classification model

I would like to discuss two classifications that, in full-scale, attempt to encompass the diversity of microtonal music (including different divisions of the octave as well as tuning models). They are systematizations provided by Julia Werntz and Georg Friedrich Haas. As mentioned above, Werntz suggests grouping microtonal compositions into two main categories based on (Werntz 2001, 160–61):

- (1) pure tuning and
- (2) the simple addition of pitches.

While Haas in his article “Mikrotonalität” points out four types (Haas 2003, 59):

- (1) equal divisions of the octave,
- (2) overtone series proportions/just intonation,
- (3) *Klangspaltung*,<sup>32</sup> and
- (4) aleatoric microtonality.

However, in general, both classifications overlap and select the same components/objects. That is, the first category by Werntz corresponds to Haas's second category and exposes, in Werntz's words, a “rejection”/“correction” of the 12-note equal temperament model (Werntz 2001–2003).<sup>33</sup> Just intonation is the most commonly applied model (among others: neo-meantone, Pythagorean temperament, etc.), where with the help of microtones one could attain “acoustically correct tuning” that is based on, for example, pure thirds 5/4 and fifths 3/2. Additionally, Haas includes the scale systems based on natural scale and harmonics.

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31 Moreover Haas, an Austrian composer often presented as a second-generation spectralist, applied this approach in his own music too, as Robert Hasegawa discussed on Haas's use of just intonation and equal temperaments in his music pieces like *Blumenstück* and *in vain* (Hasegawa 2015).

32 *Klangspaltung* or “tone-splitting” is explained as the production of harmonic impulses out of tiny, but audibly still perceptible intervals.

33 According to Werntz, “composers in this category have in common a philosophical attraction to the notion of obtaining pure (i.e. truly consonant) intervals”, having in mind such figures as Harry Partch, Ben Johnston, Lou Harrison, experiments with the mean-tone tuning at the Huygens-Fokker Foundation, as well as compositions by spectralists (Werntz 2001, 161–63).

The second category presented by Werntz characterizes an “expansion” inside the 12-note equal temperament model (Werntz 2001–2003).<sup>34</sup> Dealing with various cases of pitch addition, Werntz identifies three subcategories, where two subcategories manifest as a random use of microtones such as (a) masses of sound, microtonal clusters, and (b) ornaments as simple coloring of an ordinary 12-tone scale, and in certain way resemble Haas’s third and fourth categories.<sup>35</sup> In the third subcategory Werntz places equal division of the octave (cf. Haas’s first category) and calls it “the most genuine effort to develop a truly microtonal language” (Werntz 2001, 176). If Werntz talks about the creation of minute equal scales only, with 24, 36, 72, and so forth, notes (e.g. the scale of 24-note consists of equal quarter-tones, a 36-note scale of the sixth-tones and so on), Haas includes equally set scales with intervals that are not only smaller, but also larger than a semitone, i.e. he provides the examples of octave division into 19 and 10 equal parts.<sup>36</sup>

## 2.4 What vs. how

The classifications by Werntz and Haas may be found elaborated enough because of their inclusion of various operations with microtones, though they basically rely on technological manipulation with a certain element of music – the interval. So these classifications question mainly *what* is employed in the microtone structure of music.<sup>37</sup> But lets raise a question *how* the microtones are treated, as does Lithuanian composer Rytis Mažulis who pointed out that “the composer, who decides to deal with microtones

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34 Werntz discusses the chrestomatic cases of Carrillo, Hába and Wyschnegradsky as well as music by Iannis Xenakis, György Ligeti, Krzysztof Penderecki, her teacher Joe Maneri and earlier examples by Charles Ives, Béla Bartók and “fleetingly even” Alban Berg. For example, for the latter composer Werntz indicates mm. 274–76 and 441–43 from Berg’s *Kammerkonzert* (Werntz 2001, 172–83).

35 Regarding the use of microtones in the ornamental, sound cluster manner, I would refer to Douglas Keislar, who states that “microtones are frequently used in an ornamental fashion, or to increase density of texture” (Keislar 1991, 174).

36 Interestingly, but in his own music Haas, on the contrary, makes a declaration against the label of microtones:

I am not really comfortable with being pigeonholed as a ‘microtonal composer.’ Primarily I am a composer, free to use the means needed for my music. There is no ideology regarding ‘pure’ intonation, either as Pythagorean number mysticism or as a notion of ‘Nature’ determined by trivial physics. I am a composer, not a microtonalist. (Varga 2011, 102)

37 In my opinion, the statement by Ezra Sims below focuses mainly on tone relations as well: We call our musics, so far, by the name of the *scale* used in them (pentatonic, diatonic, twelve tone), not the *tuning* that happened to be the ideal at one time or another (just intonation, Pythagorean, meantone, equal temperament). So I would further suggest that microtonal must describe the *gamut*, not the tuning – that it must be microtonal no matter *how* it’s tuned. (Sims 1991, 237) [italics by Ezra Sims]

in his composition, should first make a choice whether he is going to use microtones as a *decorative tool* or as a *structural element*" (Mažulis 2015, 159) [italics by R.P.].<sup>38</sup> This motivates us to get back to cases, such as those mentioned by Werntz, like masses of sound, microtonal clusters, and ornaments as coloring.<sup>39</sup> Again I would refer to Mažulis's statement that "when we are dealing with quarter-tone music based on conventional rhetorics, like *Three Quarter-Tone Pieces* by Charles Ives, the traditional notions as melodic shape, linear pattern, or expressive gestures are still valid. However, the effect might be certainly different for the piece composed of much smaller intervals (2 or 3 cents approximately)" (Mažulis 2015, 159). Thus, in preparation for my discussion of the use of microtones in Lithuanian contemporary music, I propose a classification, again – a binary model, generally juxtaposing opposite compositional intentions, that is, systematic and non-systematic application of microtones.

Focusing on non-systematic cases, I have in mind composers who employ microtones, let's say, occasionally and sporadically and/or for coloristic purpose. Most often we may observe an aspiration to add some variety to the traditional 12-note musical texture. Thus the microtone implication in the tonal soundscape results in the coloring of traditional harmony and even evokes disorder (or accidental/false sound). The way microtones can be integrated may vary from single pitch ornamentation to the sleek transition from tone to tone, from unison sounding in subtle deviations of quarter-tones to the effect of glissando. Thus I suggest including the following in the group of non-systematic manifestation of microtones:

- ornamentation, "inflection" of traditional tones/pitches, creating effects close to, for example, a traditional trill or vibrato,

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38 Being passionately involved in microtones, both in their creation and in investigating them, Mažulis has described his own "laboratory" and composing. As the composer emphasizes the linearity in microtonal music, for him a melody is the central parameter determining certain microtonal aspects of music texture. Therefore, based on his oeuvre, Mažulis has indicated five ways to operate with microtonal melody: 1) motif-based structure; 2) pendulum motion; 3) microphonic contour; 4) gliding notes; and 5) resulting patterns (Mažulis 2001 & 2015).

39 We will agree that microtones of coloristic purpose are common especially in the texture of tonal, 12-tone music, appearing mostly in, let's say, an ornamental manner. This is what Daniel James Wolf was talking about with Charles Ives's use of microtones: besides distinguishing two types of structural approach (like "fully integrated quarter-tone melodic and harmonic textures" in *Three Quarter-Tone Pieces* and "experiments with a form of just intonation based upon the harmonic series" in the sketches for a *Universe Symphony*) Wolf points out a coloristic category, when Ives separates the unison by a quarter-tone interval or employs quarter-tones to ornament melodic line or chords (Wolf 2003, 5). When talking about the coloristic type of microtones Werntz invokes a description such as "inflection of the traditional sounds" with a reference to Bartók's Sonata for solo violin, mm. 3–4, 6–10 and 58–9 (Werntz 2001, 174).

- “multiplication” of unison, when the main tone/pitch is surrounded by its “doppelgängers”, that is, secondary tones/pitches, yet attributed to the main tone-field, deviate from the central tone by distance smaller than semitone,<sup>40</sup>
- emphasizing microtonal transition, inserting additional pitches in between the semitones, e.g. treating quartertone as a gradual transition point between two 12-tet pitches and moreover, creating an effect of smooth and sleek glissando,
- aspiration for un(de)tuned (non-clear or even “false”) harmony, creating unclear chords, seeking to escape from still potent remnants of classical tradition, and
- purpose of stylization inserting certain tones/pitches typical for non-Western harmonies.

The systematic approach includes examples of music composition based on a particular type of logic and a system applied to the whole musical work. This can be achieved using the following:

- employment of a certain **scale** that already exists or is specially designed and consists of microtonal relationships, etc.
- application of certain **tuning** based on or with added microtones
- application of the **glissando phenomena as the overall model**,<sup>41</sup> that is, the principle of glissando in parallel to certain compositional rules determines the whole structure of the composition
- adaptation of an all-encompassing composing system, combining different parameters and creating a micro-dimensional network.

I would like to note that the presented classification is open to supplementation with more cases. As the purpose of my study is to highlight the ways microtones are employed in Lithuanian contemporary music, certain points are derived from the compositions by Lithuanian authors that I will discuss further.

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<sup>40</sup> Multiplication of unison may be compared to the “Klangspaltung” in Haas’s categorization, if focusing on beating or interference effects.

<sup>41</sup> The idea of large-scale glissando would remind various earlier examples, e.g. the slow change of chords in Saariaho’s *Vers le blanc* (1982) described by the composer in her “Timbre and Harmony” article, or common technique in the compositions by James Tenney (*Koan* for solo violin, 1971).

### 3 Observations on Lithuanian composers' microtonal manner

Despite being in the European periphery of new music, as early as in the interwar decades, Lithuania experienced a very direct influence in the sphere of microtonality. Mainly thanks to certain composers who went to study abroad, it was a chance to join the European musical modernism of the 1920s and 1930s. A pupil of Hába, Jeronimas Kačinskas (1907–2005), whom Hába recalled as one of the best students in his class of composition, after studying at Prague conservatory, started to actively promote microtonal music upon his return to Lithuania<sup>42</sup> and faithfully continued his teacher's experiments with quarter-tones and a thematic music in his own compositions.<sup>43</sup> However, the outbreak of WWII forced Kačinskas to emigrate, and his career with microtonal music was interrupted for a long period, mainly because of the absence of direct followers and/or adherents of quarter-tone music novelties. In the last decade of the twentieth century, the renewed interest in the microtone approach manifested alongside similar processes worldwide. But having in mind compositional practice until the '90s, Lithuanian composers primarily used such abstract features like glissando sound masses or employed undetermined pitches that could be performed freely. During the postwar period up to the 1990s, very few attempts to employ microtonal elements and use certain pitch notation in the regular score can be noted. Among them is Vytautas Barkauskas's very subtle message in the beginning of *Monologue* for oboe, Op. 24, composed in 1970.<sup>44</sup>

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42 It is worth remembering, that Hába's class in microtonal composition was the only higher education course before WWII, and thanks to his efforts the quarter-tone music formed into a strong counter-current to the Second Viennese School. While through Kačinskas Lithuanian students were introduced to microinterval music by playing the quarter-tone harmonium, in 1933 he briefly taught a course on quarter-tone music at the Klaipėda School of Music and made attempts to establish a class of microtonal composition at the Kaunas Conservatory. One year earlier, in 1932, he founded the journal *Muzikos barai* and started to publish texts promoting microtonality, the same year he founded the Association of Musician-Progressivists with some colleagues, which led to the establishment of the Lithuanian section of the International Society for Contemporary Music in 1936.

43 Looking at the extant *Nonet* (1931–1932/1936) for nine strings and winds one could witness a remarkable example of non-programmatic, non-illustrative and somewhat abstract and rationalistic music. Hába considered this *Nonet* to be one of the prime examples of modern music composed in the 1930s while Lithuanian critic and composer Vladas Jakubėnas named it "a visionary reverie" (a review published in: JAKUBĖNAS, Vladas. 1938. "J. Kačinsko kūrinys skamba Londone" [Kačinskas's Composition Performed in London]. *Lietuvos aidas* (June 25, 1938): 1). However, nearly all of Kačinskas's microtonal attempts disappeared during WWII. Luckily, a few years ago, his Concerto for quarter-tone trumpet and symphony orchestra (1930–1931) and Trio No. 1 for trumpet, viola and harmonium in the quarter-tone system (1933) were discovered in Czech archives.

44 In the early '60s Vytautas Barkauskas (b. 1931) was one of the first in Lithuania to experiment with serial, aleatoric, collage and other techniques. In the context of that time of official, politically moderate musical language, Barkauskas's ideas boldly declared the avant-garde. Focus on the oboe drew the composer's attention a few years prior to *Monologue*, and in 1968 he composed *Intimate Composition* for oboe and strings, Op. 15, effectively exploring sonoristics and employing aleatoric elements, in some manner

*Monologue*'s introduction is based on the oscillation around tone E5,<sup>45</sup> ornamented with single and double trills; he uses bisbigliando and flageolets and the subtly ascending and descending semitone glissandos E5–F5 (later, the glissando effect is exploited richly in the score). It is worth noticing that during the first transition from E5 to F5, instead of regular glissando, Barkauskas recorded a quarter-tone sharp emphasizing the singularity of semitone transition (see Example 3).

Example 3: Beginning of Barkauskas's *Monologue* for oboe, Op. 24 (1970)

The gust of avant-garde in the 1970s left various imprints in the music scores by Lithuanian composers; however, quarter-tone employment remained uncharacteristic. In his *Monologue*, Barkauskas recorded the quarter-tone symbol only once in the whole three-page score, and thus it makes an especially eloquent gesture. Such brief, albeit very subtle manipulation with single tone ornamentation and treatment of glissando in the *Monologue*'s introduction, in some sense, provide a very common way to express microtonal sound in future works by Lithuanian composers. Later on Barkauskas incorporated quarter-tones in his works quite often, among the brightest

reflecting Penderecki's *Capriccio*. After presenting *Monologue* in 1970, the piece was published by Edition Peters in Leipzig one year later. *Monologue* is surrounded by memorable incidents; while attending Warsaw Autumn festival Barkauskas passed the score to oboist Lothar Faber, who performed the piece at the Rouen Festival, France. As a result, Barkauskas was forbidden to go abroad for five years, and the Soviets banned the performance of his *Intimate Composition* at Warsaw Autumn.

45 In my study I apply the International Standards Organization (ISO) system for register designations where the middle C is C4. Accordingly, an octave higher than middle C is C5, and an octave lower than middle C is C3.

examples: Second Symphony, Op. 27 (1971, quarter-tones in the 1<sup>st</sup> and 4<sup>th</sup> parts), First String Quartet, Op. 31 (1972; quarter-tones in the 3<sup>rd</sup> part *Volando semplice*), Third Symphony, Op. 55 (1979), and Concerto piccolo for chamber orchestra, Op. 88 (1988).

That same year, in 1970, Jurgis Juozapaitis composed the symphonic poem *Stained-glasses* and three years later presented his *Rex Symphony* (1973), both scores colorfully employing quarter-tones. These works to some extent summarized the composer's youthful attempts under the influence of avant-garde techniques. However, his early works predicted that sound color would occupy a special place in the composer's music.<sup>46</sup> To create a snaking sound mass in the strings in the beginning of *Rex Symphony*, besides emphasized glissandos and multilayered chords, Juozapaitis invoked quarter-tones (see Example 4). The manner Juozapaitis manipulates with quarter-tones is an inflection of ordinary (12-TET) pitch, for example, creation of a detuned unison "wrapping" single tone with neighboring quarter-tones. According to the composer, the use of quarter-tones in his scores was mainly a result of the intuitive desire to enhance the expression and color of sound. This kind of approach was brightly implemented in his atonal attempt from the '80s; the score of the Second String Quartet (1984) is richly mottled with quarter-tone sharps and flats and primarily intended to create smooth transitions and tiny trills.<sup>47</sup> Here, Juozapaitis consistently applies the 24-TET system, creating symmetrical and gradually expanding scales around precisely chosen central tones (e.g. in the beginning of the Quartet, tone B acts as the axis for symmetric scale with the range of two major seconds up and down) (see Example 5).<sup>48</sup>

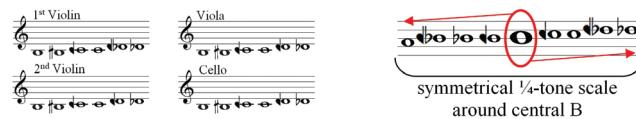
46 Jurgis Juozapaitis's (b. 1942) early works from the very beginning of the 1970s clearly tended to dodecaphonic, quarter-tone and aleatory experiments. After soon recognizing avant-garde as having alien aesthetics, Juozapaitis abandoned it, in future works focusing more on the spontaneity and natural flow of sounds alongside expressive atonal works. He then composed pieces akin to the aesthetics of neoromanticism and minimalism. "I'm moving away from numerically based logic, from constructivism. It's much more important to feel intuitively the free flow of the music, the right moment of inspiration."

47 Besides *Stained-glasses*, *Rex Symphony* and Second String Quartet, Juozapaitis's œuvre presented some other bright examples with quarter-tones, mainly composed in the '70s–'90s, among them: chamber symphony *Jūratė and Kqstytis* (1975), *Aphrodite (Five Metamorphoses)* for oboe (or flute) (1975–1976), *Night Music* for string quartet (1997), and *Tower Counterpoints* for symphony orchestra, created in 2003. Incidentally, the latter score was awarded the first prize at the Sinfonia Baltica international competition for symphonic music in Riga in 2004.

48 While analysing the score a ¼-tone flat error was identified in the notation of 1st violin part (rehearsal number 1): instead of D4 ¼-tone flat ♭ should be D4 ¾-tone flat ♭ to be consistent with the quarter-tone trill and symmetry of the scale around central pitch B. By the way, in his music Juozapaitis applied quarter-tone symbols close to today's notation, ♭, ♯, ♭, and ♯.



Example 4: Juozapaitis' *Rex Symphony* (1973), mm. 1–3, glissando like transition in quarter-tones



Example 5: Juozapaitis's *Second String Quartet* (1984), manuscript score, p. 1, rehearsal number 1. Manipulation with quarter-tone trills and transitions, above: reduction of symmetrical tone scale with axis B

Juozapaitis's approach to quarter-tones and the 24-TET scale mainly arises from the intention to enrich and color traditional sound space. While nearly a decade later, Šarūnas Nakas's *Wings to Cross the Abyss* for alto saxophone (1996) along with the three-part cycle for ensemble *Chronon* (1992–1996), namely in part one, *Sources. Birds*, and part three, *Sea. Sky*, presented a systematic use of quarter-tones employing the 24-TET division throughout the work alongside a serial-like approach.<sup>49</sup> For example, in the first ten bars of the composition for alto saxophone, Nakas presented the complete 24-TET scale ranging from F3 to F5 ¼-tone sharp (see Example 6).

*J=84*

Example 6: Nakas's *Wings to Cross the Abyss* (1996), manuscript score, mm. 1–10, presenting the complete 24-TET (normal digits indicate natural 12-TET pitches, digits in italics – quarter-tones)

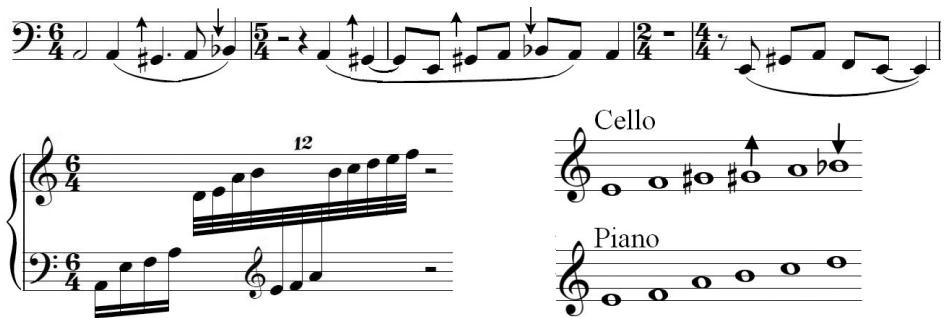
<sup>49</sup> Šarūnas Nakas (b. 1962), who has earned a reputation as a “transgressor” of accepted norms, presented his innovative works based on Dada, Merz and the ideas of futurism as early as in the 1980s. The search for new types of expression was always typical for the composer, thus exploiting quarter-tones in his experiments seems sequential as well. Besides composing *Wings to Cross the Abyss* and *Chronon* cycle, other bright examples of systemic use of 24-TET in Nakas's oeuvre were carried out later, e.g. in the pieces for ensemble, *Aporia* (2001) and *Eyes Dazzled by the North* (2004), as well as his symphonic score *Nude*, composed in 2004. The latter I discuss below in the context of glissando phenomena.

For quarter-tone notation in his saxophone piece, as well as in *Chronon*, Nakas used five symbols supplementing regular accidentals with arrows indicating  $\frac{1}{4}$  or  $\frac{3}{4}$ -tone up or down,  $\flat$ ,  $\natural$ ,  $\flat\flat$ ,  $\sharp$ , and  $\sharp\sharp$ . The use of certain accidentals marked the division of the score into three sections: the margin section features accidentals with down arrows, while the central section, mm. 93–127, employs accidentals with up arrows. Original symbols for quarter-tone notation were used by Vytautas Germanavičius in his compositions from the same period: for example, in *EOS* for tuba solo (1995) he recorded self-invented graphics (recalling the number 4) with arrows to indicate  $\frac{1}{4}$ -tone up or down ( $\downarrow\downarrow$ ,  $\uparrow\uparrow$ ). While searching for the appropriate expression in the piece three years later, *Other Space* for voice, flute, horn and three cellos (1998), Germanavičius inserted the specific digits 4 and  $\frac{1}{4}$ . The diversity in notation, typical for Lithuanian music towards the end of the twentieth century, on the one hand, marked the search for self-expression and, on the other hand, reflected how tendencies in microtonal music composition were not always followed.

Since his first attempts in the '90s Germanavičius<sup>50</sup> has been involved in composing with microtonal sound. Very few of his compositions represent a stylistic approach, for example, in the 2010 cycle for cello and piano, *25 haiku*, and an arrangement of his two earlier vocal cycles *13 haiku* and *12 haiku*. If we have a look at the first part of his instrumental miniatures (13 haiku after various Japanese poets), we notice a quasi-pentatonic scale centered around tone G, that is, a freely altered model of tuning for the Japanese instrument the koto. The scale varies from one haiku to another, with certain tones added or removed, in some cases enlarged up to a nearly complete diatonic scale, and additional chromatic tones as well some quarter-tones inserted. Therefore, the application of accidental quarter-tones, inflecting the traditional (this time, pentatonic) sound, serves mainly the purpose of stylization. For example, in the material of the 8<sup>th</sup> haiku, mm. 36–42, the cello part is composed of five tones, which are shaped into an artificially altered pentatonic, while the piano part is composed of six pitches of white-key diatonics (see Example 7).

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50 Vytautas Germanavičius (b. 1969), the recipient of Fulbright and Sir William Glock scholarships, composed pieces with a balance between intuition and new compositional techniques, but particular attention is focused on the variety of sound color and its transitions, and the timbral spectrum of sound. Invoking microtonal sound is one of the most appropriate ways to achieve this goal. Therefore, Germanavičius constantly returns to the quarter-tones, and he recently experimented with the creation of an individual system based on microtonal relations emerging from overtone series.



*Example 7: Germanavičius's 13 haiku (2010), mm. 36–40, presenting quasi-pentatonic scale with quarter-tone inflections in cello part and scale of 6 diatonic tones in piano part*

Overlooking many other attempts by Germanavičius, it is clear that his focus stays on sound ornamentation using traditional tone inflection. The coloristic approach may be represented in one of the most recent large-scale scores for solo violin and symphony orchestra, *Horizontal Drift Trilogy* (2018), mainly its first part *Angelus Oculus*, where the quarter-tones appear in the strings (while the rest of orchestra performs in the traditional manner). Let's say sporadic quarter-tone inflections appear in the texture of *Ihr Schatten schneller Zeit, Ihr leicht beschwingten Stunden!* for two sopranos and chamber orchestra (2015) or in *Rote Bäume* for flute, cello, and organ (2018). While in the first and third sections of the trio *Nidamannrieg* (2001) quarter-tone accidentals ornament certain pitches very similar to those in the *Alien Dances* for string orchestra and percussion (2010), where the  $\frac{1}{4}$ -tone sharp is applied to create a subtle "migration" around the central tone C (it is obvious in the first bars; see Example 8). Germanavičius exploits the quarter-tones for transitional purpose too, as he did in the instrumental miniature trio *Falling Raindrops* (2005) or in his piece *Black Shadows – White Shadows* for accordion and string quartet (2008). In the latter work we can see the combination of regular glissando in the strings and descending two-tone cluster produced by accordion (in between the transition is enriched with quarter-tone flats; see Example 9).

Example 8: Germanavičius's *Alien Dances* (2010), mm. 1–8: "migration" around central tone C

Example 9: Germanavičius's *Black Shadows – White Shadows* (2008), mm. 49–54: quarter-tone employment for glissando/transition effect

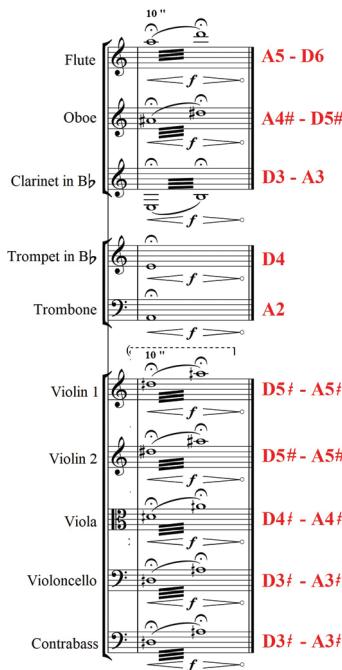
In the analyzed works Germanavičius mostly deals with microtonal sound in strings, which is probably the most common field for other composers, too. But for Marius Baranauskas<sup>51</sup> the human voice is no less interesting in expressing microtonal sound in his works, which provide a focus on certain kind of quarter-tone ornamentation. Fascinated with the phenomena of unison

<sup>51</sup> A middle-generation Lithuanian composer Marius Baranauskas (b. 1978) is typically occupied with "translating" words into musical sounds and timbres. He first implemented a method of his own invention whereby he subjectively attributes acoustic and timbral equivalents to every sound of the spoken language in his symphonic oeuvre *Talking* (2002), which was awarded the third place at the prestigious Toru Takemitsu Composition Competition in 2004. The verbal-musical game is the main focus in Baranauskas's creative sphere; however, the employment of microtones/quarter-tones is inseparable in his experiments.

surrounded by its secondary “wrong” tones, Baranauskas implemented this idea in three scores of 2008–2011. As early as in the introductory measures of *Templum Dei estis* for mixed choir (2010) we encounter the oscillation around tone A involving quarter-tones and forming a five-tone scale centered around A (see Example 10). A more refined expansion of unison may be observed at the end of the first part *Ever in My Life* from Baranauskas’s *Three Visions After Tagore* for mixed choir (2008), soprano part, invoking specific signs – arrows – for microtonal expression of glissando as well as quarter-tone accidentals (see Example 11). According to the composer, this use of quarter-tones was consciously based on continuous expansion and narrowing/returning to the initial tone, like “breathing” in the sense of a single tone or seeking its “un-tuned”, “false” sound. A similar manipulation with “un-tuned” harmony was continued in his 2011 work, *The Trapezium* for 10 instruments, for example, in the structure of the very final chord of the four-part composition (see Example 12). Choosing the harmoniously stable sound of D–A combination, the composer at the same provides its inflection, a quarter-tone “shadow”, blurring the direct sound of perfect fifth.

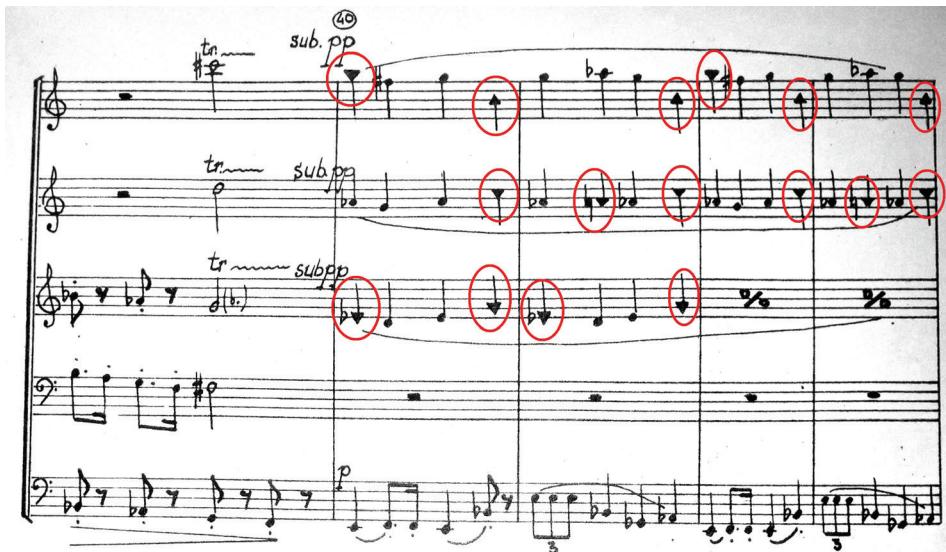
Example 10: Baranauskas’s *Templum Dei estis* (2010), mm. 1–4 presenting the oscillation around A

*Example 11: Baranauskas's Three Visions After Tagore (2008), final section of the part #1 Ever in My Life, mm. 19–29: manifestation of microtonal glissando (notation in arrows) and quarter-tone accidentals*



*Example 12: Baranauskas's The Trapezium (2011), m. 191 exposing the chord D–A with quarter-tone inflection*

The desire for un-tuned or deformed, “false” like harmony, signifying the use of quarter-tones in Baranauskas’s music, has its own aesthetic background for this composer. But such interpretation also recalls the wrongly established semantics of quarter/micro-tone as sound out of tune that was common in the 1980s and 1990s. The latter point of view was specifically encouraged by Laurynas Vakaris Lopas to involve some microtonal sounds in his example of Western harmony, Quintet for woodwinds from 1986. Based on his recollections of demonstrations on special occasions during the Soviet period, the composer intended to convert an image of “false” society, injecting ideological slogans into his music and creating a harmony somewhat out of tune. In the third part of his Quintet, marked with the tempo marking Allegro ironico, Lopas inserted a four-bar march-like fragment recalling the rhythm from Tchaikovsky’s 6<sup>th</sup> symphony, 3<sup>rd</sup> mvt., and colored with microtonal deviations of certain tones. He used his own symbols for approximate raising and lowering (instead of noteheads, Lopas recorded triangles pointing up and down, ▲ and ▼; see Example 13).

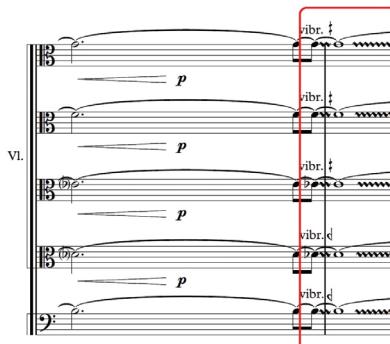


Example 13: Lopas's Quintet (1986), manuscript, rehearsal number 40 exposing the use of "un-tuned" pitches marked with triangles instead of noteheads

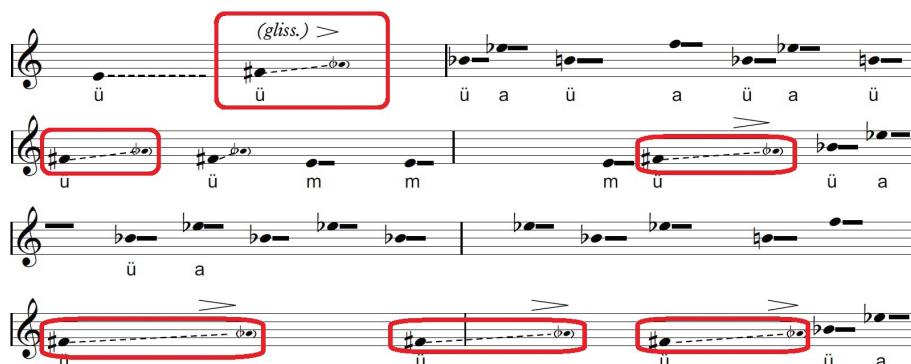
Now, I would like to discuss some cases in music by Onutė Narbutaitė<sup>52</sup> that expose her attitude to microtonal ornamentation in music. Narbutaitė has pointed out three main ways she includes a microtonal sound effect in her oeuvre: various types of glissando, technique of vibrato, and trills. Moreover, in the composer's opinion, the microtonal sound may emerge even when a special performance technique on strings like sul ponticello is applied. So, according to Narbutaitė's statement, it is obvious that the composer deals mainly with the ornamentation and inflection of regular sounds and the various effects of transition. The ornamentation, or sound inflection, is typical for large-scale symphonic works such as *Riverbank-River-Symphony* (2007) and *La Barca* (2005) as well as the vocal part in her 2017 work for soprano and flute, *Labyrynth*, which explores a rich "arsenal" of vocal abilities and expresses whistle tones, glissandos and double sounds in the part for flute. A certain approach to microtonal effects may be provided in such works as *Was There a Butterfly?* for string

52 Onutė Narbutaitė (b. 1956) is one of Lithuania's best-known female composers. In Lithuania and beyond she is still often presented as a neo-romantic. We can hear recognisable melodies and quasi-tonal seventh harmonies in Narbutaitė's music. However, the composer underlines the rationality of her music that is expressed by meticulously detailed textures, exact proportions of smaller and larger sections and the overall form, as well as the understated interplay of minute details. The abstract musical narrative is extremely expressive, prominent and often reminiscent of "something familiar". The composer draws inspiration from a multitude of experiential sources such as texts, stories, images and sensations.

orchestra (2013), where Narbutaitė invoked the quarter-tone accidentals by requesting a special implementation of vibrato in the strings (see Example 14). As for *Heliography* for female voice (soprano), viola, cello, and drums (2015) this composition exposes an intriguing approach to glissando very typical for Narbutaitė (according to the composer, her favorite) – in the first section, instead of a solid ascending or descending line, the composer requests a dotted (punctuated) performance, thus creating a flowing series of tiny microtones (of course, the size and quantity of microtones depend on the individual performance), as it is implemented in mm. 9–16 (see Example 15).



*Example 14: Narbutaitė's Was There a Butterfly? (2013), 2 bars before rehearsal number 5: request for vibrato with quarter-tones*



*Example 15: Narbutaitė's Heliography (2015), mm. 9–16, an example of dotted glissando resulting in microtonal transition; above: direction for performance of dotted line by composer*

The musical score consists of two main sections. The left section shows fragments of the introduction for the strings (Violin I, Violin II, Viola, Cello, Double Bass) and a piano part. Red boxes highlight specific melodic and harmonic structures. The right section shows a continuous piano part with sustained notes and dynamic markings like f, ff, and ppp.

The musical score shows an ascending quarter-tone scale for the 1st violin, mm. 1-36. The first staff shows an ascending quarter-tone scale from D2 to G5# with dynamic markings: ppp, pp, p, mp, mp, p, pp, and .mf. The second staff shows a continuation of the scale with dynamic markings: f, ff, f, mf, mp, p, pp, and ppp.

*Example 16: Nakas's Nude (2004). Fragments of the introduction: mm. 1–6, entrance of strings; m. 21, dynamic climax and chord structure; mm. 33–6, final cluster of 19 tones from D2 to G5# concluding the quarter-tone glissando. Below: ascending quarter-tone scale, creating glissando, in the 1<sup>st</sup> violin part, mm. 1–36.*

The argument to link glissando with microtonal sound and microchromatics arises not only from Narbutaitė's or Baranauskas's approach. In a broader sense, the principle of glissando is able to shape the overall structure of music composition. For example, the analysis of the beginning section from Nakas's *Nude*, a 2004 composition for symphony orchestra, exposes a constantly enlarging "sound cloud" in the strings that is based on precisely written

out quarter-tones creating an ascending and descending glissando-like effect centered around its axis (pitch B3). The composition of introduction reveals a rationalized and precise calculation typical for Nakas. In the span of 36 bars the Lithuanian composer has designed 19 simultaneously sounding quarter-tone lines performed by 19 string instruments. All instruments start their quarter-tone ascent or descent from the same pitch, the initial B3. Gradually moving further, the parallel melodies arrive at the final chord/cluster consisting of 19 tones and ranging from D2 to G5# (see Examples 16 & 17). Moreover, the principle of gradual motion is applied to the level of dynamics, creating a sequence of dynamic markings from *ppp* to *ff* with the climax in m. 21, very close to the golden section (that is, very likely, a result of conscious calculation by Nakas). Looking at two tone clusters appearing in the most important locations of the introduction (that is, climax and final chord) we come to the symmetric structure forming around the centre – the initial tone B3. The symmetrical shape of “growing” glissando cluster is represented in the graphic (see Example 17).

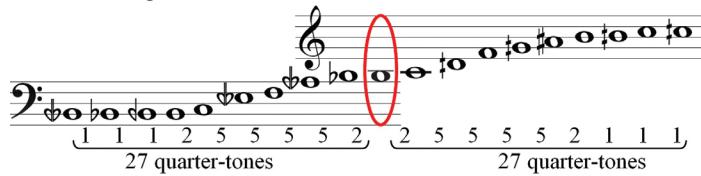
The complete music composition arising from a single tone, like in the Introduction of Nakas’s *Nude*, is typical for Justė Janulytė’s music too. As well as the glissando-like approach, she employs a slow transition from one chord to the other, and an extremely slowed down motion like zooming into the very depth of sound, its essence.<sup>53</sup> The score of *Sandglasses* for four cellos, live electronics, video and installation (2010) is based on systemically applied glissando lasting strictly 50 minutes. The inspiration of the piece is a simultaneous launch of several sandglasses of different capacity and duration. This idea is materialized in music by a polytemporal canon. Cellos pass through their entire register at different rates.

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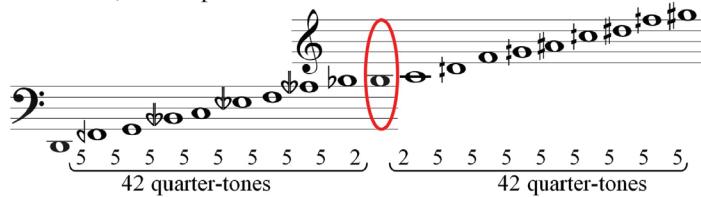
53 Justė Janulytė (b. 1982) often writes for dense monochromatic ensembles (e.g. only strings, only winds or only voices). She seeks to explore musical time/space perception through large-scale multilayered textures and to strike a balance between the aesthetics of minimalism, spectralism and drone music. The impulse for her music comes from the various optical and physical ideas as well as images of nature. According to Vita Gruodytė, Janulytė’s music is somewhat of “a promenade in the space of sound [...] as if we were inside the sound trying to catch the shadows of sound” (cited from Gruodytė, Vita. 2015. “Esu garsinių fenomenų stebėtoja.” *Kultūros barai* 12: 3).

Janulytė’s creative approaches in some sense recall the words by James Tenney, which state that the listener should catch the form (logic) of the composition in the very first minutes in order to just listen so that they can get into the sound the rest of the time.

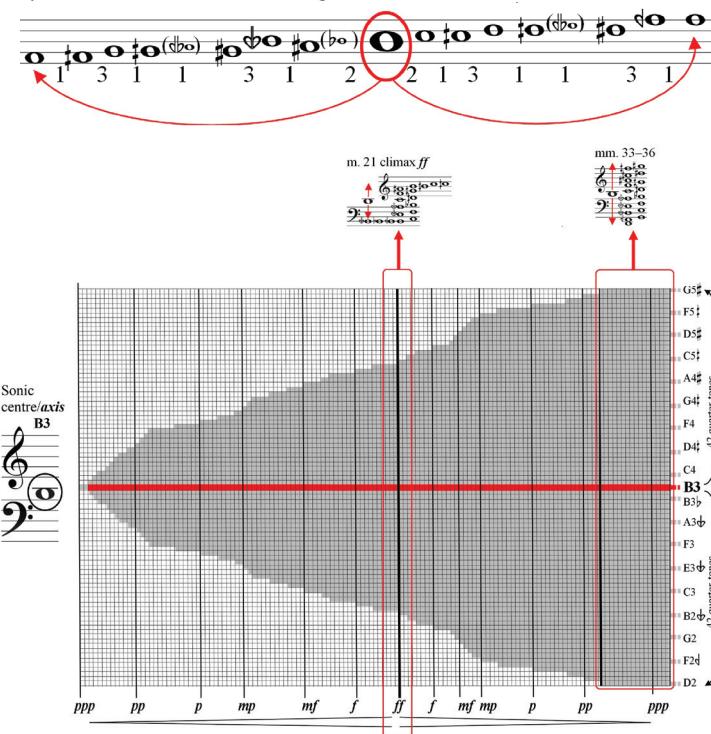
m. 21, linear representation of *tone cluster*



mm. 33–36, linear representation of *tone cluster*

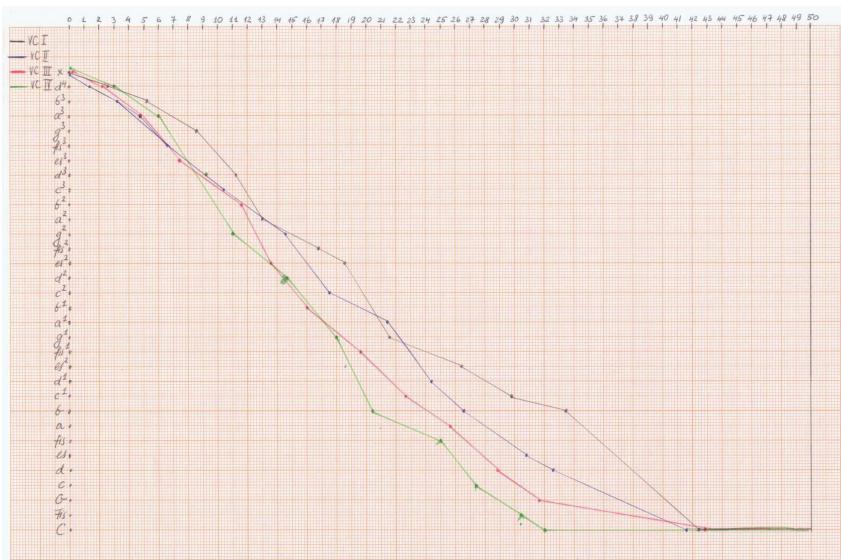


symmetrical reduction in the range of octave around the axis



*Example 17: Nakas's Nude (2004), introduction, mm. 1–36. Graphic representation of quarter-tone ascension and descension, imitating glissando, from the single tone B3 to the cluster of 19 tones in the range D2–G5# centered around the axis B3*

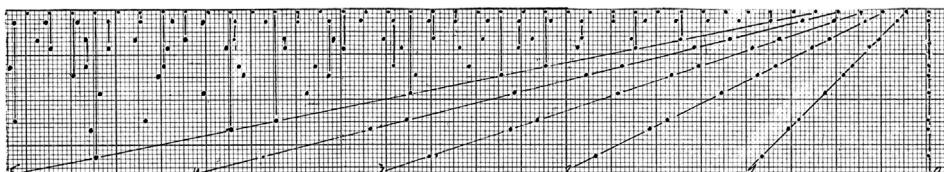
Thus, the initial unison (tone D) splits off, and the voices continue to move further from each other and reach the lowest note at different moments. As in the case of Nakas's *Nude*, Janulyté applies gradually increasing dynamics from *ppp* to *fff* and backwards, arriving at the climax at the 34<sup>th</sup> minute (an approximate golden section of total duration, 50 minutes). Though the descending tones form a G harmonic minor scale, but recording the long-lasting tones, and then repeating them slower, the overall sound results in a dense microtonal texture (see Example 18). However, this kind of microtonality is only perceptible as the result of a glissando yet not fixed or controlled otherwise. One more composition, *Radiance* for mixed and live electronics (2015) follows the technique implemented in *Sandglasses*, with a metaphoric reference to the nuclear explosion. Starting with an octave of tone A (sopranos and altos sing A4, and tenors and basses start singing A3), the groups of voices gradually move up and down musically imitating the process of radiating and splitting. Such process determines the structure of the composition expressed as an overlap of two antiphonal processes of radiation. Though the score uses regular notation, similar to *Sandglasses*, the subtle and non-simultaneous transitions create the microtonal effect. Therefore Janulyté's composing motto obviously resembles the microtonal approach, just like looking through the telescope on the atoms of sound.



Example 18: Janulyté's *Sandglasses* (2010), a graphic sketch representing live performance of four cellos creating gradually descending glissando and forming microtonal texture<sup>54</sup>

54 Graphic sketch provided by composer.

If we want to further discuss the systematic approach, the work by Justina Repečkaitė,<sup>55</sup> a young-generation Paris-based Lithuanian composer, is worth taking a look at. Since 2014 Repečkaitė has continuously composed with quarter-tones that have become an inseparable part of her musical language. According to the composer, music creation is equal to encoding, thus the treatment of microtonal sound in her works varies from, for example, a spectral approach connected with the temporal canon like in *Pulsus Flatus Vox* for ensemble (2014) (see Example 19) to the harmony of illusory spectrum based on arithmetic, not acoustic, calculations (for these calculations Repečkaitė typically employs Open Music software). Fascinated with microtonal sound, Repečkaitė often employs her favourite music intervals such as neutral second and neutral third, like in the ensemble piece *Tapisserie* (2015). Its compositional principle consists of binding different attacks of sound in order to create a timbre, dynamics and rhythm polychromy, while the absence of any harmonic movement results in a stable harmony that helps the listener to hear neutral intervals (neither minor nor major) made possible by the use of microtones. The pre-compositional chart for *Tapisserie* reveals a very strict and diligent organization of music texture while the map of the ensemble piece *Acupuncture* (2014) provides a rational manipulation with Fibonacci numbers (see Example 20).



Example 19: Repečkaitė's *Pulsus Flatus Vox* (2014), a graphic sketch representing the spectral arrangement of tones and polytemporal canon<sup>56</sup>

55 Ben Lunn has pointed out that Justina Repečkaitė's (b. 1989) "music has many similarities to a diamond. With its hard unforgiving shape and geometric perfection, it creates a profound and striking beauty". The composer is very strict in her composing process and accurately chooses every detail and makes calculations. On the one hand, Repečkaitė's music is complicated and intense intellectually, but on the other, the result is clarified and polished.

56 Graphic sketch provided by composer.

*Example 20: Score reductions indicating the main elements of the sound material; above – Repečkaitė’s Acupuncture (2014), below – Tapisserie (2015)*

Now, let's focus on all-encompassing microtonal approach in the works by Rytis Mažulis,<sup>57</sup> the last composer to be discussed in this study. According to Lithuanian musicologist Gražina Daunoravičienė, the "microdimensional" concept is the most suitable for Mažulis's style (Daunoravičienė-Žuklytė 2016, 320). Mažulis's fascination with tone division began in the 1980s and 1990s with spirals of whole-tone scales such as in his canon *The Dazzled Eye Has Lost Its Speech* for four voices (1985) or the computer pieces *Canon aenigmaticus* (1990–1992) and *Clavier of Pure Reason* (1992–1994), which were composed with the structures containing superimposed thirds. Later, Mažulis turned to the micro-world and a variety of semitone fractions. As Daunoravičienė pointed out, a great part of Mažulis's oeuvre, starting with the semitones in *Hanon virtualis* in 2002, "make a picture of a progressively increasing division of a semitone into still smaller microintervals" that are quarter-tones, octa-tones, deca-tones or even *triginta partes de semitone*<sup>58</sup> (Daunoravičienė 2003, 58).

Besides manipulation with small fractions, in 1996, while composing *Palindrome* for computerized piano, Mažulis started to experiment with one-center generated sound structures, composing music derived from a single melodic pattern, or even one note. Being a true admirer of Renaissance polyphony and the sophisticated network of polytempo, Mažulis obsessively uses canon technique and complicated isorhythmic patterns. The impression of chaos created out of a diligently constructed simple order would describe his music laboratory too. For example, *Ex una voce* (2004) is based on a single melody multiplied into 13 parts that are performed at different tempos and create an impression of disorder.

The variety of microtones is exposed in his works like *Sybilla* for mixed choir (1996) employing  $\frac{3}{4}$  intervals and endless canon moving in a circle that is possible to design geometrically. The initial motif of this canon, a pattern, microtonally envelops the central tone; later, the motif is transposed from the tones of a white-key diatonics.

The subtle piece *ajapajapam* for 12 voices, string quartet and electronics (2002) features the intervals of 3.333 cents moving in a very slow glissando, gradually expanding into six-part texture and canonically descending a minor sixth; finally all six lines form one large cluster, dominated by minor seconds.

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57 Representing the so-called super-minimalist approach, which is also called the "machinist" approach, Rytis Mažulis (b. 1961) presents laboratory-like creations but does not forget the principles of balanced academic correctness. Fascinated with microscopic sound material, writing music with the limits of a single halftone lets the composer maintain stylistic purity and loyalty to a rational background.

58 Division of semitone into 30 parts.

The use of quarter-tone series and their inversions as well as mensural proportions (6 : 4 : 3 : 2 : 1 : 2... etc.) is typical for Mažulis's *Canon mensurabilis* for six instruments (2000); while *Cum essem parvulus* for eight voices (2001) manipulates using the microtones of 20 cents and polytemporal system that creates a palindrome shape. Again, the focus on polytempo is typical for *Schizma* for 14 flutes (2014), at the same producing microintervals of different size, dividing the semitone into 24–49 equal parts and applying a similar procedure to the time values.

An especially elaborated and sophisticated approach to canon technique and microtonal divisions is brightly presented in one of Mažulis's most recent compositions, *Solipse* for cello and electronic tape (2018), intended for 32 cellos (one live performer and 31 pre-recorded samples). The structure of the composition builds up, let's say, an image of multi-dimensional glissando:

- first, a polytemporal effect is achieved by gradually slowing down the tempo (a map of tempos for live cello part (see Example 21) indicates the strict slowing down of one second every next note; thus the first note continues only 1 second while the final note, numbered as 69, sounds for 10 minutes);
- second, starting with tone C6 the melody descends in subtle distances that are recorded in cents, and the calculation of the required cent amount is based on summing certain note number and cent amount as follows (see also Example 21):

(C6) C	1/0, <b>2</b> /1, <b>3</b> /3, <b>4</b> /6, <b>5</b> /10, <b>6</b> /15, <b>7</b> /21, <b>8</b> /28,
	<b>9</b> /36, <b>10</b> /45, <b>11</b> /55, <b>12</b> /66, <b>13</b> /78, <b>14</b> /91
B	<b>15</b> /5, <b>16</b> /20, <b>17</b> /36, <b>18</b> /53, <b>19</b> /71, <b>20</b> /90
B-flat	<b>21</b> /10, <b>22</b> /31, <b>23</b> /53, <b>24</b> /76
A	<b>25</b> /0, <b>26</b> /25, <b>27</b> /51, <b>28</b> /78
G-sharp	<b>29</b> /6, <b>30</b> /35, <b>31</b> /65, <b>32</b> /96
G	<b>33</b> /28, <b>34</b> /61, <b>35</b> /95
F-sharp	<b>36</b> /30, <b>37</b> /66
F	<b>38</b> /3, <b>39</b> /41, <b>40</b> /80
E	<b>41</b> /20, <b>42</b> /61
E-flat	<b>43</b> /3, <b>44</b> /46, <b>45</b> /90
D	<b>46</b> /35, <b>47</b> /81
C-sharp	<b>48</b> /28, <b>49</b> /76
C	<b>50</b> /25, <b>51</b> /75
B	<b>52</b> /26, <b>53</b> /78
B-flat	<b>54</b> /31, <b>55</b> /85

A	<b>56/40, 57/96</b>
G-sharp	<b>58/53</b>
G	<b>59/11, 60/69</b>
F-sharp	<b>61/28, 62/88</b>
F	<b>63/49</b>
E	<b>64/11, 65/74</b>
D-sharp	<b>66/38</b>
D	<b>67/3, 68/69</b>
C-sharp	<b>69/36</b>

- third, every next cello enters the same pitch C, but at a different tempo that is a second tempo from the previous cello part (i.e. if the first-live cello is marked in seconds 60, 59, 58, 57, 56, 55, ..., then the second cello/1<sup>st</sup> pre-recorded sample starts at 59, 58, 57, 56, 55, ...; the third cello at 58, 57, 56, 55, ... and so on);
- fourth, despite every next cello entering with a slower tempo, the total duration of the performance is equal to the first live cello (i.e. every next cello part is digitally stretched to the original “size”, so its duration in seconds deviates from the original series in seconds).

In total, Mažulis designed a series of 69 notes, descending from C6 to C4#. The duration of the piece was determined in advance when he chose the starting tempo mark 60. Respectively it was possible to slow down the tempo up to 1 (in total 60 different tempos) plus composer divided value 1 into tenth parts and obtained 9 additional tempos such as 0.9, 0.8, 0.7, 0.6 and so on. Thus Mažulis arranged 69 different tempos. The design of the tempo respectively determined the number of notes.

Gradual slowing down: 1 s at every next note

Violoncello

Violoncello

mp 1 sec

1.016 sec 1.034 sec 1.052 sec 1.071 sec 1.091 sec 1.111 sec 1.132 sec

Violoncello

9  $\text{J}=52$  10  $\text{J}=51$  11  $\text{J}=50$  12  $\text{J}=49$  13  $\text{J}=48$  14  $\text{J}=47$  15  $\text{J}=46$  16  $\text{J}=45$   
 1.153 sec 1.176 sec 1.2 sec 1.224 sec 1.25 sec 1.276 sec 1.304 sec 1.333 sec

Violoncello

17  $\text{J}=44$  18  $\text{J}=43$  19  $\text{J}=42$  20  $\text{J}=41$  21  $\text{J}=40$  22  $\text{J}=39$  23  $\text{J}=38$  24  $\text{J}=37$   
 1.364 sec 1.395 sec 1.428 sec 1.463 sec 1.5 sec 1.538 sec 1.578 sec 1.621 sec

Violoncello

25  $\text{J}=36$  26  $\text{J}=35$  27  $\text{J}=34$  28  $\text{J}=33$  29  $\text{J}=32$  30  $\text{J}=31$  31  $\text{J}=30$  32  $\text{J}=29$   
 1.666 sec 1.714 sec 1.764 sec 1.818 sec 1.875 sec 1.935 sec 2 sec 2.068 sec

Violoncello

33  $\text{J}=28$  34  $\text{J}=27$  35  $\text{J}=26$  36  $\text{J}=25$  37  $\text{J}=24$  38  $\text{J}=23$  39  $\text{J}=22$  40  $\text{J}=21$   
 2.142 sec 2.222 sec 2.307 sec 2.4 sec 2.5 sec 2.608 sec 2.727 sec 2.857 sec

Violoncello

41  $\text{J}=20$  42  $\text{J}=19$  43  $\text{J}=18$  44  $\text{J}=17$  45  $\text{J}=16$  46  $\text{J}=15$  47  $\text{J}=14$  48  $\text{J}=13$   
 3 sec 3.157 sec 3.333 sec 3.529 sec 3.75 sec 4 sec 4.285 sec 4.615 sec

Violoncello

49  $\text{J}=12$  50  $\text{J}=11$  51  $\text{J}=10$  52  $\text{J}=9$  53  $\text{J}=8$  54  $\text{J}=7$  55  $\text{J}=6$  56  $\text{J}=5$   
 5 sec 5.454 sec 6 sec 6.666 sec 7.5 sec 8.571 sec 10 sec 12 sec

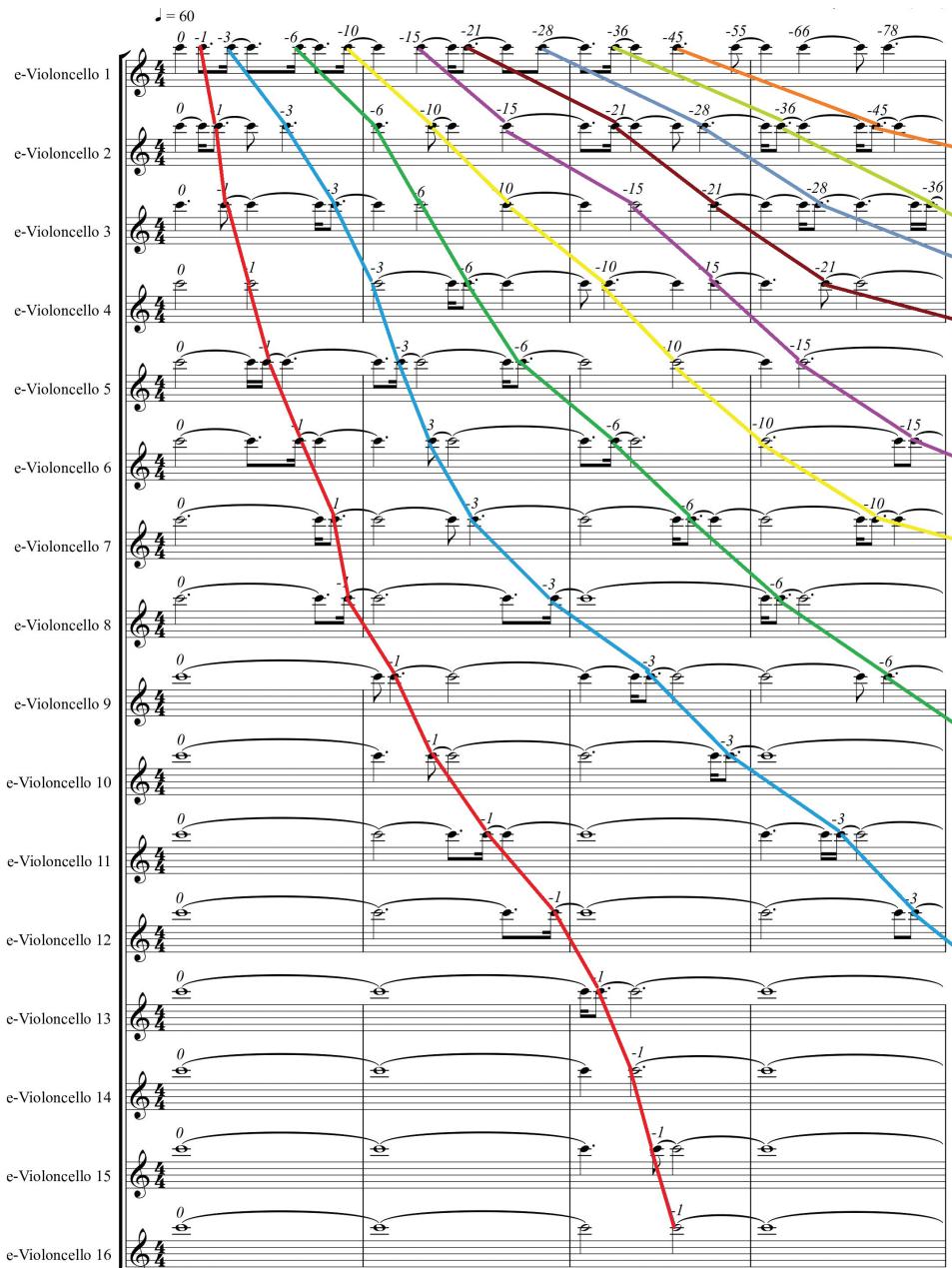
Violoncello

57  $\text{J}=4$  58  $\text{J}=3$  59  $\text{J}=2$  60  $\text{J}=1$  61  $\text{J}=0.9$  62  $\text{J}=0.8$  63  $\text{J}=0.7$   
 15 sec 20 sec 30 sec 1 min 1 min 6.66 sec 1 min 15 sec 1 min 25 sec

Violoncello

64  $\text{J}=0.6$  65  $\text{J}=0.5$  66  $\text{J}=0.4$  67  $\text{J}=0.3$  68  $\text{J}=0.2$  69  $\text{J}=0.1$   
 1 min 40 sec 2 min 2 min 30 sec 3 min 20 sec 5 min 10 min

Example 21: Mažulis's Solipse (2018), the map of gradually slowing down tempo designed for live cello part



Example 22: Mažulis's Solipse (2018), mm. 1–4 graphical reduction of the score presenting the overall form of the composition

The *Solipse* score is an example of a strongly technologized process of creation as well as performance. Due to very complicated and strict scores, Mažulis has reduced the personality of performer to a nearly mechanical state, while the audience also encounters challenges. Also with the help of the computer Mažulis is able to operate maximally reduced intervals that are hardly perceptible by ear. As Horst-Peter Hesse pointed out, the experiments with specially built psalteries revealed that the  $1/_{12}$ -tone is the limit suitable for practical purpose (Hesse 1991, 214) (Hába too had described the  $1/_{12}$ -tone = 17 cents as the smallest interval in his *Neue Harmonielehre*). However, there is no stop sign for Mažulis, whose sound world is immersed deeply into microscopic tone-divisions up to 1 cent. In *Solipse* Mažulis, in his own words, has achieved the maximal purity of creative mind expression, obtaining a highly hypnotic music process. Moreover, the solid architecture of the score has collected inside the diversity of microtonal manipulations from the adoration of unison and refined transitions to overall glissando forming a microdimensional result.

#### 4 Examples of microtone notation in Lithuanian music

The analyzed music scores by Lithuanian composers provide a diverse vocabulary of symbols indicating the same objects. Up to the end of the twentieth century Lithuanian composers applied their own signs that greatly vary from one another but generally intend to express the same action, for example, a quarter-tone rising or falling. Starting with an example by Kačinskas, in the score of his Trio for trumpet, viola and harmonium (1933) we may see refined ornaments resembling notation by Hába, his teacher from the Prague Conservatory. Starting from the 1970s composers have used different symbols, reflecting a period full of creative research and experiments as well as confrontation with political restrictions.<sup>59</sup> Some symbols were invented by composers themselves (e.g. triangle signs by Lopas, digits with arrows in Germanavičius's scores), while others were related to the established accidentals (like in Juozapaitis's Second String Quartet, or Nakas's piece for saxophone solo).

Around the turn of the twenty-first century, we may notice the use of more unified symbols that mainly come from scorewriter programs. The table

<sup>59</sup> In the 1960s and 1970s Lithuanian composers were partly restrained in becoming acquainted with the novelties in music composition techniques and the processes happening behind the Iron Curtain. The information was typically obtained through attendance to Warsaw Autumn or other creative-based travel. I should mention the fact that Vytautas Barkauskas, after having visited Tallinn in 1963, bought home a copy of Křenek's study on 12-tone composition, provided to him by Arvo Pärt.

below provides a list of symbols for quarter-tone and/or microtone notation applied by Lithuanian composers. While most signs are linked strictly to certain quarter-tones (lowering/raising the pitch by  $\frac{1}{4}$  or  $\frac{3}{4}$ -tone), other symbols suggest free performance of an undetermined pitch (however, it should typically be smaller than a semitone). Among the latter examples I should mention the triangle symbols by Laurynas Vakaris Lopas or the up and down arrows by Marius Baranauskas.

Symbol Composer	$\frac{3}{4}$ -tone lower	$\frac{1}{4}$ -tone lower	$\frac{1}{4}$ -tone higher	$\frac{3}{4}$ -tone higher	Other symbols Remarks
Kačinskas		↓	↑	♯	
Barkauskas			†		
Juozapaitis	♭	↓	†	♯	
Lopas		▼	▲		Triangle instead of notehead. Not exact quarter-tone, but smaller than semitone.
Germanavičius		↓↓	↑↑		N. – to cancel $\frac{1}{4}$ -tone raising/falling Signs in the scores from 1995 & 1998
	↓	↓↓↓	↑↑↑	♯♯	
Nakas	↓	↓	↑↑	♯	Manuscript, 1996
	♭	↓	†	♯	Printed scores
Baranauskas		↓	†	♯	→ → – to move higher or lower, not in strict quarter-tones.
Narbutaitė		↓	†		† – also for undetermined, but smaller than semitone, raising.
Repečkaitė		↓↓	↑↑		
Mažulis		↓↓	↑↑		
	Certain pitches and/or intervals recorded precisely in cents				

Table 1. A list of symbols for quarter-tone and/or microtone notation applied by Lithuanian composer

## 5 Conclusions

Finally, let me reinterpret a question by Douglas Keislar, “Why the interest in microtones?” Could it be a search for flexibility in music, a desire “to weave musical narrative,” as editor Noah Kaplan remarked in the introductory text to the English translation of Wyschnegradsky’s *Manual* (Wyschnegradsky 2017)? The evident focus of Lithuanian composers on the coloristic approach of microtones could also be an answer. Thus, summarizing the manifestation of microtones in Lithuanian works, the most common cases represent the ornamentation or inflection of traditional sounds and chord harmonies and the application of transitional tones and special attention to glissando requiring expression of the microtonal composition (among such composers – the discussed examples from ‘70s and ‘80s and recent by Barkauskas, Juozapaitis, Nakas, Germanavičius, Narbutaitė, Baranauskas, Janulytė). On the other hand, few authors maintain a consistent path in creating rationally constructed compositions and yet maintain the energy of expression (such as Mažulis and Repečkaitė).

Paraphrasing Andrew Granade, Harry Partch was a revolutionary who desired “to replace the forms or instruments of Western music,” while others, like Ben Johnston, maintain a connection to established canons “using violins and cellos, sonatas and symphonies” and just wish “to bring clarity to music” (Granade 2007, 297). At every moment, the creator is concerned about not getting lost in technological manipulations, as Mark Swed would say, “to make both radical thinking and avant-garde techniques sound invariably gracious.”<sup>60</sup>

Imagine looking at home movies when the person running the projector suddenly improves the focus. It is a pleasant but definite shock to see how much clearer the images are now, even though we had accepted them before the adjustment. (Johnston 2006, 171)

Thus, Ben Johnston expressed adoration for just intonation in his “Maximum Clarity” essay from 1996 reprinted in his collection 10 years later.<sup>61</sup>

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60 This quotation is an extract from a statement by critic Mark Swed describing Ben Johnston: “probably our most subversive composer, a composer able to make both radical thinking and avant-garde techniques sound invariably gracious” (Johnston 2006, xi).

61 This is how Johnston’s quote continues: “This is a very precise analogy to what happens when the players in a musical ensemble clean up intonation. [...] What is actually happening when such ensemble tuning is proceeding well is that the versions of the intervals which have the smallest numbers in the vibration ratios are being selected. This is what just intonation is, at its simplest.” (see Johnston 2006, 171–80)

What if we ally ourselves with Hába's and Schoenberg's view regarding non-harmonics<sup>62</sup> as well as accept the existence of parallel sound-worlds of different tunings? Then the fascination with microtone harmonies may award us with a sense of admiration and enjoyment, like suddenly realizing how hazy the world was before. Let's look through the microscopic lens to peer more deeply into the essence of music.

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62 Calling for creative freedom in his widely known *Neue Harmonielehre* Hába followed up Schoenberg's statement that there are no nonharmonic tones, i.e. "each tone can be combined with any other tone of any tone system" (HÁBA, Alois. 1927. *Neue Harmonielehre*. Leipzig: F. Kistner & C.F.W. Siegel: vi; cited from Hesse 1991, 217).

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