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INNOVATIVE PROCESSES IN 20TH-CENTURY MUSIC: FROM THE AVANT-GARDE TO THE DIGITIZATION OF MUSIC

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SUMMARY. The musical art of the twentieth century is characterized by the rapid evolution of styles, genres, and expressive means, inspired by the development of technology, including in the field of sound recording and electronic musical instruments. The purpose of this paper is to provide a generalized overview of the innovations that appeared in music during the twentieth century and determined its stylistic diversity. The research methodology is based on an empirical approach that includes the analysis of musicological literature and the analysis of scores by composers from different countries who worked in different musical genres and made the greatest contribution to the introduction of the latest compositional techniques. It has been found that innovations in the music of the twentieth century affect the timbral palette and peculiarities of the pitch organization of the musical fabric. The renewal of timbral diversity is primarily associated with the development of electronic sound synthesis, which opens up opportunities for generating sounds inaccessible to acoustic musical instruments. By the end of the twentieth century, special synthetic sounds became the basis of electronic dance music, such as techno and house. Innovative methods of pitch organization refer to composers' searches aimed at expanding or introducing

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alternatives to the classical tonal system. Such alternatives include modality, serial technique, and microintervals. These updates concern not only the author's material, but also the methods of composer's work with folk music - the combination of folk melodies with innovative harmonic and timbral solutions became the basis of neo-folklorism.

Keywords: harmony, timbre, 20th century music, tonality, modality, serial music, electronic music, musical education, training of musicians, media, mediatization, digitalization, cultural discourse.

Introduction

Throughout the twentieth century, various art forms experienced rapid renewal. The catalyst for these processes was scientific, technical, and technological progress, in particular the emergence of sound recording, video recording, and electronic computing. Music technologies, including recording equipment and new musical instruments, have **"**shaped the way music is created, performed, distributed, and consumed"[6]. The latest technological tools are unattainable with traditional means and thus expand the artist's possibilities. Collaboration between science and art helps to expand the boundaries of knowledge and fosters creativity[7].

It should also be noted that the numerous trends and events that occurred in music education during the second half of the twentieth century allowed the profession to remain a diverse and dynamic component of education, particularly in the United States, thanks in large part to the leadership of the Music Educators National Conference[8]. The sharply increased dynamics of scientific and technological progress, urbanization as a cultural phenomenon that left its mark not only on architecture but also on people's lifestyle and artistic thinking, extreme radicalism in the search for means of artistic expression, leading to a deliberate, emphasized break with tradition, as well as the interest of artists (musicians, painters, writers) in mythology, and on the other hand, in

[6] Lerch, Alexander. "The Relation Between Music Technology and Music Industry." In *Springer Handbook of Systematic Musicology*, edited by Rudolf Bader, Springer, 2018. https://doi.org/10.1007/978-3-662-55004-5_44

[7] Nyakayo, O. A. "The Intersection of Science and Art: Collaborative Approaches." *Newport International Journal of Engineering and Physical Sciences*, vol. 5, no. 1, 2025, pp. 1–6. https://doi.org/10.59298/NIJEP/2025/511600

[8] Mark, Michael L. "Music Education since Mid-Century: The Role of the Music Educators National Conference." *Journal of Aesthetic Education*, vol. 33, no. 3, 1999, pp. 79–92. https://doi.org/10.2307/3333703.

cosmology, in metaphysical principles, in themes related to space - all this together determined the genetic sources of avant-gardism, was reflected in its aesthetics, and led to a departure from excessive pedagogic conservatism in music education.

Musical art has its own arsenal of expressive means related to the pitch and timbre characteristics of sound. And since music, unlike the visual arts, is a temporal art[9], the peculiarities of the unfolding of sounds in time also play a significant role. These characteristics have also been influenced throughout the history of art, and this influence became especially noticeable with the development of technology in the early twentieth century. Social media and virtual reality[10], which began to develop at the turn of the XX-XXI centuries, also significantly expand the scope of musical expressive means[11].

Thus, the purpose of our article is to investigate which expressive means and forms of sound organization have become the latest in the twentieth century.

Literature review

An analysis of the literature of recent years shows the predominance of research on the use of computer technologies for the creation or analysis of musical material at the present stage. These studies can be divided into several areas: research on digital workstations (DAWs) designed to create music, research on analytical technologies for music information retrieval (MIR), and the study of the possibilities of creating musical compositions by artificial intelligence.

Among the most recent DAW studies is[12] work, which provides a comparative analysis of modern software - Apple Logic Pro X, Cubase 12, Ableton Live Lite 11. The author notes that choosing a DAW is a difficult task for independent producers, as each of them has its own advantages and disadvantages[13].

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[9] Stambaugh, J. “Music as a Temporal Form.” *The Journal of Philosophy*, vol. 61, no. 9, 1964, pp. 265–280. https://philpapers.org/rec/STAMAA.

[10] Fan, Y. “The Practical Guidance of Music Aesthetics in Musical Art Practice.” *Journal of Education and Educational Research*, vol. 11, no. 3, 2024, pp. 22–25. http://dx.doi.org/10.54097/mxk9w068.

[11] Marynin, A. Ye. “Transformation of Digital Technologies in the Music Industry at the End of the 20th – Early 21st Century.” *Bulletin of National Academy of Managerial Staff in Culture and Music*, no. 2, 2024, pp. 311–315. https://journals.uran.ua/visnyknakkkim/article/view/308417/300073.

[12] Yang, Y. “Analysis of Different Types of Digital Audio Workstations.” *Highlights in Science, Engineering and Technology*, vol. 85, 2024, pp. 563–569.

[13] Yang, Y. “Analysis of Different Types of Digital Audio Workstations.” *Highlights in Science, Engineering and Technology*, vol. 85, 2024, pp. 563–569.

Research on analytical programs has been of continuing interest over the past two decades. Among the most recent works is the research by Rentana WuYixiao Pan, which demonstrated the high performance of the newly developed derivative-free optimized refined random forest (DFO-RRF) technology, which allows to **"**assign a track to certain styles of electronic dance music based on timbral and metrical characteristics"[14]. In a similar study, [15] used convolutional neural networks (CNNs) and recurrent neural networks (RNNs) to recognize music genres. Audio files were analyzed using Mel-spectrograms. According to the researchers, the use of machine learning in genre classification reflects a **"**broad shift" in the music industry[16]. Some studies are devoted to attempts to apply analytical technologies to analyze folk music, including videos of ritual music from the West African Akan tribe[17] and recordings of Indian classical raga[18].

Music creation with the help of artificial intelligence is also one of the most relevant areas of research. For example, Sampada[19] investigates the use of deep learning to generate music in ABC notation format using recurrent neural networks (RNNs). The author proposes a system that learns from a large dataset of ABC notation, generates new musical compositions, and converts them to MIDI and WAV formats for easy playback.

Corbelli[20] raises ethical, aesthetic, and legal issues of using AI to create music. The author believes that AI can be **"**a powerful tool capable of supporting, assisting, and facilitating the work of the composer", but the shortcomings

[14] Wu, R., and Y. Pan. "Providing Music Selection and Matching Suggestions for Dance Creations Using Music Information Retrieval and Artificial Intelligence Techniques." *Journal of Computational Methods in Sciences and Engineering*, 2025. https://doi.org/10.1177/14727978251318807.

[15] Naidu, P., et al. "Classification of Music Genres Using Multimodal Deep Learning Technique." E3S Web of Conferences, vol. 616, 2025, 02012. https://doi.org/10.1051/e3sconf/202561602012.

[16] Naidu, P., et al. "Classification of Music Genres Using Multimodal Deep Learning Technique." *E3S Web of Conferences*, vol. 616, 2025, 02012. https://doi.org/10.1051/e3sconf/202561602012.

[17] Moore, S., N. Asare, and S. Kubiti. "Ndwom: A Multimodal Music Information Retrieval Dataset for Akan Musical Videos." 2025. https://doi.org/10.21203/rs.3.rs-5876078/v1.

[18] Jayanthi, J., and V. Upendran. "Raga Recognition of Indian Classical Music Using Meerkat Optimization Based MFCC and Fine Tuned BILSTM-XGBOOST." *Circuits, Systems, and Signal Processing*, 2025, pp. 1–29. https://doi.org/10.1007/s00034-025-02999-w.

[19] Sampada, K. S., et al. "Algorithmic Orchestration: Deep Learning Techniques in Music Generation." *PowerTech Journal*, vol. 49, no. 1, 2025, pp. 802–813. https://powertechjournal.com.

[20] Corbelli, Andrea. "Beyond the Algorithm: Ethical and Aesthetic Challenges of AI in Music." *Itinera*, 2024, https://doi.org/10.54103/2039-9251/27842.

of AI [...] still **"**require the intervention of musicians, who are and will remain indispensable to give the musical object the status of a work of art"[21].

The development of more traditional music, composed for symphony or vocal groups, has received relatively less attention from researchers, which is a sign of the vacuum being filled.

Methods

The study is based on empirical research methods. In order to identify innovations, the musicological literature on innovative compositional techniques and scores by composers from different countries who worked in different musical genres and made the most significant contribution to the introduction of the latest compositional techniques, in particular P. Hindemith, A. Schoenberg, B. Liatoshynsky, O. Messiaen, K. Stockhausen, and W. Lutosławski, was studied. Particular attention is paid to such aspects as the tonal and atonal organization of the sound space, the use of micropolyphony, sonorous effects, aleatorics, electroacoustic elements and other techniques that have become crucial in the music of the XX-XXI centuries. The results obtained allow not only to systematize the latest compositional techniques, but also to outline the main vectors of their further development, which is important for understanding the contemporary musical language and the processes of its transformation.

Results

The fundamental musicological work that allows us to systematize and summarize the latest compositional techniques used in the first half to the middle of the twentieth century is Kohoutek's **"**Techniques of Composition in the Twentieth Century" [22]. The analysis of this book allows us to present the main innovations of this period in the following table (Table 1).

[21] Corbelli, Andrea. "Beyond the Algorithm: Ethical and Aesthetic Challenges of AI in Music." *Itinera*, 2024, https://doi.org/10.54103/2039-9251/27842.
[22] Kohoutek, Ctirad. *Novodobé skladebné směry v hudbě*. Praha, 1965.

Table 1

Innovation	Composers
Expansion of the tone system	B. Bartók, B. Britten, B. Liatoshynsky, B. Martinu, O. Messiaen, C. Debussy, J. Enescu, A. Onegger, F. Poulenc, M. Ravel, I. Stravinsky, K. Szymanowski, R. Strauss, P. Hindemith.
Modal system (artificial modes)	O. Messiaen, B. Bartók, B. Liatoshynskyi.
Micro intervals	A. Haba, C. Ives
Serial and serial technique	A. Schoenberg, A. Berg, A. Webern, Boulez, K. Stockhausen, L. Nono, E. Krshenek
Pointillism	A. Webern, K. Stockhausen, P. Boulez,
Concrete and electronic music	P. Schaeffer, K. Stockhausen
Aleatorics	K. Stockhausen, P. Boolez, J. Cage

Major innovations in music from the first half to mid-20th century
Source: author's elaboration

Let us briefly characterize the trends presented in the table.

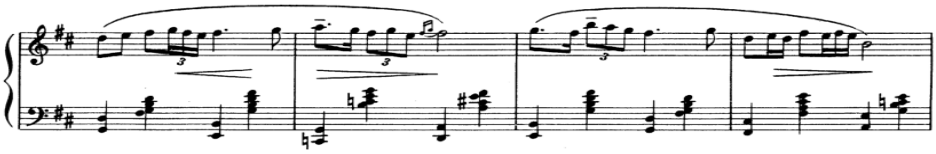
The expansion of the tonal system, which began in the works of nineteenth-century composers, is reduced to the following basic techniques or their combinations

- the widespread use of polytetrachordal chords, both in their primary and inverse forms.
- the use of altered chords (in some cases, chords with split tones).
- the formation of modulation chains without being fixed in certain keys.
- polytonality.

The use of polytertian chords (nonaccords, undecimals, tercdecimals) was widely used in the works of C. Debussy, M. Ravel, L. Revutsky, and later in jazz music, where their use was the most consistently theorized.

As an example of the use of polytetrachylic structures, let us take a fragment from the Prelude Op. 44 #2 by B. Liatoshynsky (E.g. 1). The chord sequence in this example looks like this: G_{maj7} – E_{m9} – C_{maj13} – D_{maj9} – E_{m9} – G_{maj7}- $F\#_{m7}$ – A_{m9}.

E.g. 1



**B. Lyatoshinsky. Prelude Op. 44 No. 2, measures 5-9,
as an example of the use of polytetrachylic harmony**

In some cases, especially in jazz music, polytertiary structures are used in rotations or in a modified arrangement, as a result of which individual tones are arranged in quarters or tritones, which gives rise to C. It is difficult to interpret such structures as quartal (for example, the tertiary decimals c-e-g-b-d-a in jazz piano music are usually performed in the arrangement c-b-e-a-d-g, which acoustically forms a quartal structure, but functionally remains a tertiary decimals).

Composers of the twentieth century inherit the creation of modulation chains from the works of Wagner. This is explained in the context of the idea of "infinite melody" as an embodiment of the idea of "tension of forces" or "psychic energy". An example of long chains of modulations without anchoring in intermediate keys is, for example, B. Lyatoshynsky's romance "On Jasper Steps", whose harmonic sequence is presented as follows: H_{m6} – Cis_7 – A_{m6} – $F_{6/4}$ – Cis_2 – B – D – Ges – Es_m – $G_{6/4}$ – H_{13}->E_{maj7} – Cis_9.

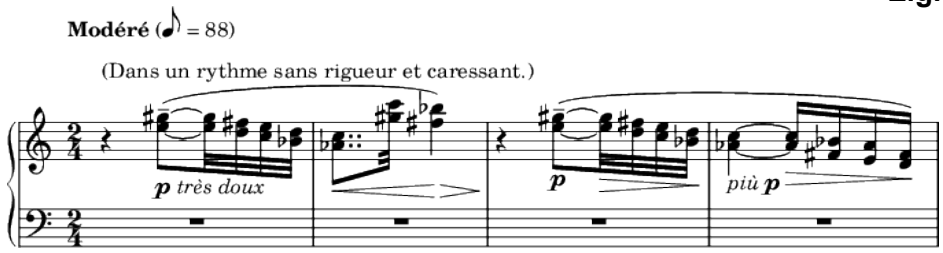
Polytone is interpreted as the simultaneous use of more than one harmonic function[23], and it was used in the works of B. Bartók, I. Stravinsky, and early works of W. Lutosławski. As an example, let us cite the beginning of Paganini's Variations on a Theme, the original theme of which begins in A minor with alternating tonic and dominant functions, the composer imposes harmonies Fmaj7, D(add6), Hm.

The modal system involves the use of artificial sound systems with an arbitrary number of sounds. An early example of the modal system is the use of whole-tone scales in Debussy's preludes (E.g. 2)[24].

[23] Leeuw, Ton de. *Music of the Twentieth Century: A Study of Its Elements and Structure*. Amsterdam University Press, 2005. ISBN 978-90-5356-765-4.

[24] Benward, Bruce, and Marilyn Saker. *Music: In Theory and Practice, I*. 7th ed., McGraw-Hill, 2003, p. 39. ISBN 978-0-07-294262-0.

E.g. 2



C. Debussy. Prelude "Voiles" as an example of the use of the whole-tone mode.

The most consistent embodiment of the modal system is O. Messiaen's "modes of limited transposition", which the author not only implemented in many of his works, but also substantiated in his scientific treatise "The technique of my musical language"[25]. While O. Messiaen used mainly static modal models that involved the observance of certain sound systems for a long time, a different approach to modality is observed in the piano works of B. Liatoshynsky, characterized by the use of dynamic modal structures that undergo constant transformations during the unfolding of the musical texture[26]. In some cases, modal and non-functional harmonic systems are also found in jazz[27] and metal[28] music.

Serial and later serial technique is considered as a technique of composition or a method based on the use of a series of sounds as the main constructive material[29]. The origin of serialism is considered to be the technique developed by A. Schoenberg (see E.g. 3), known as dodecaphony, which the author himself characterized as "a method of composition with twelve notes related only to each other"[30].

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[25] Messiaen, Olivier. *Technique de Mon Langage Musical*. Paris, 1944. https://www.rem.routledge.com/articles/technique-de-mon-langage-musical.

[26] Bezborodko, O. A. "Interaction of Composers and Performers Means of Expressiveness in the Second Sonata-Ballad by Borys Lyatoshynskyi." *Scientific Bulletin of P. I. Tchaikovsky National Music Academy*, vol. 122, 2018, pp. 110–124.

[27] Susanni, Paolo, and Elliott Antokoletz. *Music and Twentieth-Century Tonality: Harmonic Progression Based on Modality and the Interval Cycles*. Routledge, 2012.

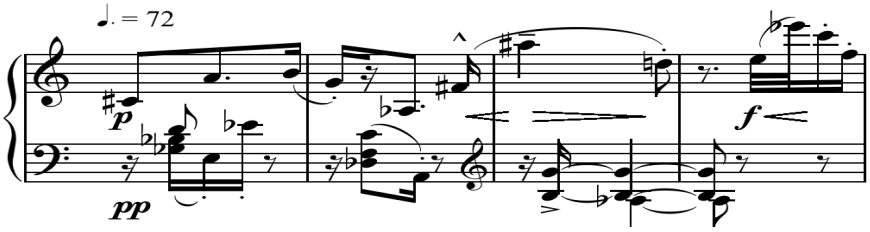
[28] Lulja, E. "Harmonic Function and Modality in Classic Heavy Metal." *Metal Music Studies*, vol. 5, no. 3, 2019, pp. 355–378. http://dx.doi.org/10.1386/mms.5.3.355_1.

[29] Griffiths, Paul. "Serialism." *The New Grove Dictionary of Music and Musicians*, 2nd ed., edited by Stanley Sadie and John Tyrrell, vol. 23, Macmillan, 2001, pp. 116–123.

[30] Schoenberg, Arnold. *Style and Idea: Selected Writings of Arnold Schoenberg*. Edited by Leonard Stein, translated by Leo Black, University of California Press, 1975. ISBN 0-520-05294-3.

Initially, the idea of a series of sounds was applied to the pitch parameter, so that the 12 sounds of dodecaphony correspond to 12 possible notes within the 12-step sound system used in European music. Later, the idea of seriality was extended to other parameters of musical sounds, such as dynamics, timbre, and duration. This extension of the serial principle became known as integral serialism or seriality [31].

E.g. 3



A. Schoenberg. Piece Op. 23, No. 5, as an early example of a dodecaphoneï

Kohoutek[32] notes that elements of dodecaphony, following the composers of the New Music school (A. Schoenberg, A. Berg, A. Webern), are also found in the works of composers who generally did not consider appropriate to completely abandon the tonal principle of organizing the musical fabric, such as I. Stravinsky or D. Shostakovich.

While serial and, especially, serial compositional techniques lead to a significant role of algorithms in the formation of musical integrity, aleatorics, on the contrary, involves a certain degree of randomness and freedom of the musician when performing such compositions. By definition, a process is considered to be aleatory "if its course is determined in general but depends on chance in its details"[33]. The most interesting from the aesthetic point of view is **"**controlled aleatoric", examples of aleatoric are the late compositions of W. Lutosławski[34]. In these compositions, aleatorics can be combined with polytonal structures.

[31] Iddon, Martin. *The Cambridge Companion to Serialism*. Cambridge University Press, 2023.
[32] Kohoutek, Ctirad. *Novodobé skladebné směry v hudbě*. Praha, 1965.
[33] Meyer-Eppler, Werner. "Statistic and Psychologic Problems of Sound." *Die Reihe*, vol. 1, 1957, pp. 55–61. https://www.scribd.com/document/834230296/Meyer-Eppler-W-1958-Statistic-and-Psychologic-Problems-of-Sound-Die-Reihe-1-Electronic-Music.
[34] Rae, B. C. *The Music of Lutosławski*. 3rd ed., Omnibus Press, 1999. ISBN 978-0-7119-6910-0.

The twentieth century also saw attempts by composers to go beyond the 12-tone system by trying to use alternative sound systems, usually with more steps within an octave. Such attempts are called microintervals or microtonality[35]. Although alternatives to the 12-tone division of octaves were noted by theorists in the musical cultures of individual nations as early as the musicologists of the 19th century, European composers turned to experiments with micro-interval structures only in the 1920s, including the first composers Alois Hába and Ivan Wyschnegradsky, C. Ives[36] .

The difficulty of introducing micro-intervals lies primarily in the technical limitations of traditional instruments, especially keyboards, which provide for a fixed division of the pitch scale. Although attempts were made in the 1920s to design quarter-tone pianos[37], such instruments remained the domain of experimentation and did not become widespread.

Microintervals have found their application in spectral music (J. Grise, T. Murray) and sonority (K. Penderecki, W. Lutosławski). In spectral music, its use is associated with the desire to form consonances based on the calculations of the sound spectrum[38]. In sonoristics, on the other hand, there was a desire to form the densest possible sound arrays, denser than semitone clusters[39].

To a large extent, innovations in twentieth-century music are associated with the invention of electric instruments and electronic sound processing. The invention of electric instruments contributed to **"**the establishment of the concept of **'**artificial **'**(synthesized) sound, a significant enrichment of the timbre palette of music of the non-academic tradition and the formation of a decentered timbre space. It also resulted in the transformation of the traditional communicative model **"**performer - instrument", the emergence of electronic dance and experimental music"[40]. Electronic music is being formed as a separate

[35] Maclagan, Susan J. *A Dictionary for the Modern Flutist*. Scarecrow Press, 2009, p. 109. ISBN 978-0-8108-6711-6.

[36] Haas, Georg. "Mikrotonalität und spektrale Musik seit 1980." In *Orientierungen: Wege im Pluralismus der Gegenwartsmusik*, edited by Jörn Hiekel, pp. 123–129, Schott Musik International, 2007. ISBN 978-3-7957-1837-4.

[37] Lindstedt, Iwona. *Sonorystyka w twórczości kompozytorów polskich XX wieku*. Wydawnictwa Uniwersytetu Warszawskiego, 2010. http://dx.doi.org/10.31338/uw.9788323510024.

[38] Fineberg, Joshua, editor. *Spectral Music: History and Techniques*. Overseas Publishers Association, 2000. ISBN 90-5755-131-4.

[39] Lindstedt, Iwona. *Sonorystyka w twórczości kompozytorów polskich XX wieku*. Wydawnictwa Uniwersytetu Warszawskiego, 2010. http://dx.doi.org/10.31338/uw.9788323510024.

[40] Kushch, Y. V. *Electromusical Instruments as an Evolutionary Factor of Musical Culture in the 20th – Early 21st Century*. PhD dissertation brief, Kyiv, 2013.

musical trend, the main material of which is “characteristic electronically synthesized or electronically dissected sounds”[41].

What is also important is that already in the early twentieth century, the landscape of music education underwent a revolutionary shift. A symphony of inventive characters and events transformed the way music was taught, opening up new possibilities and laying the groundwork for contemporary music education as we know it today. The early twentieth century also saw the introduction of technology into music teaching. Phonographs and radio broadcasts enabled students to listen to classical music and performances by well-known performers, extending their musical horizons. This technology enabled a more immersive musical experience.

The paradigm of musicians training underwent significant change in the second half of the 20th century, particularly in the final third. [42] begin with a discussion of the relationship between developmental psychology and music education, describing the mid-1980s as the emergence of the three primary subfields of music psychology: cognitive, developmental, and social. The writers then continue on to the present and beyond, arguing that a significant shift has been the addition of a social perspective and sensitivity to musical style, which, in turn, has further impacted avant-garde music landscape.

In the 1940s and 1950s, electronic music developed in two competing directions – “concrete music” (P. Schaeffer) and electronic music itself (K. Stockhausen). While the former was aimed at recording and subsequent combinations of sounds of the natural or man-made environment, the latter was actually aimed at synthesizing sounds with the help of electronic technologies. From the point of view of modern electronic music technology, these approaches should be seen as complementary - sampling and synthesis. In the 1970s, electronic music gradually entered the sphere of popular music. By the end of the XX century, the original sound of TR-808 and TR-909 became the basis of such dance electronic music trends as techno, house and their variations.

Dance music and electronic music mostly remain within the classical tonal system. However, it is the search for timbral solutions that is becoming the main driving force behind creative innovations in electronic music. The introduction of combinations of timbres that cannot be produced with traditional

[41] Bondarenko, A. *Electronic Music in Ukraine in the Last Third of 20th – the Beginning of 21st Century*. PhD dissertation, Kyiv National University of Culture and Arts (KNUKiM), 2021.

[42] Hargreaves, David, Nigel Marshall, and Adrian North. “Music Education in the Twenty-First Century: A Psychological Perspective.” *British Journal of Music Education*, vol. 20, no. 2, 2003, pp. 147–163. https://doi.org/10.1017/S0265051703005357.

musical instruments is becoming a distinctive feature of electronic music and the basis for the diversity of its trends. Timbre is becoming a key characteristic of sound, one of the leading means of expression in the musical arts[43].

However, electronic music does not exclude the use of innovative harmonic systems. For example, Stockhausen's Etudes uses a serial technique in combination with an 81-step octave division[44], which makes this work innovative both in timbre and harmony. Electronic music has provided additional opportunities for the development of microintervals due to the fact that synthesizer programming imposes virtually no technical limitations on the calculation of sound frequencies, and thus on the possibilities of arbitrary division of the sound system[45].

Innovations in the music of the twentieth century also affected the work of composers with folklore material, which received the generalized name of neofolklorism. Neo-folklorism of the first half of the twentieth century is mostly associated with the use of "songs of archaic folklore origin, which were developed on the basis of repetition and variation, often with blurring the contours of the folklore theme"[46]. Among the representatives of this trend are B. Bartók and I. Stravinsky, and partly the early works of B. Liatoshynsky and V. Liutoslavsky. The second folklore wave, associated with the postmodern era, is characterized by "a bolder use of folklore in its 'pure' and 'pristine' form, along with the latest means of expression"[47]. This wave is characterized by ethnophonisms, which are defined as "the timbre and sound aspect of folk instrumentation"[48] for instrumental music or the use of folk singing styles[49] for vocal music. This approach is most widespread in Ukraine, thanks to the tradition of, on the one hand, the academicization of such folk instruments as the bandura, and, on the other hand, the cultivation of folk choral singing as an alternative to academic singing, which ensures "the formation of an

[43] Reshetnyk, D. "Timbre in Music: Problems of Concept Definition." *Young Scientist*, no. 11, 2020, pp. 76–79. https://doi.org/10.32839/2304-5809/2020-11-87-17.

[44] Stockhausen, Karlheinz. *Texte 2: Aufsätze 1952–1962 zur musikalischen Praxis*. Edited by Dieter Schnebel, Verlag M. DuMont Schauberg, 1964, p. 37.

[45] Lindstedt, Iwona. *Sonorystyka w twórczości kompozytorów polskich XX wieku*. Wydawnictwa Uniwersytetu Warszawskiego, 2010. http://dx.doi.org/10.31338/uw.9788323510024.

[46] Derevianchenko, O. *Neofolklorism in Musical Art: Statics and Dynamics of Development in the First Half of 20th Century*. PhD dissertation brief, National Music Academy of Ukraine, 2005.

[47] Bondarenko, A. *Electronic Music in Ukraine in the Last Third of 20th – the Beginning of 21st Century*. PhD dissertation, Kyiv National University of Culture and Arts (KNUKiM), 2021.

[48] Broiako, N. "E. Stankovych's «Symnoi Drimbi Zvyki» in the Aspect of Embodiment of the Neofolkloristic Tendencies." *Music Art and Culture*, vol. 1, no. 30, 2020, pp. 19–24, https://doi.org/10.31723/2524-0447-2020-30-1-3.

[49] Bondarenko, A. *Electronic Music in Ukraine in the Last Third of 20th – the Beginning of 21st Century*. PhD dissertation, Kyiv National University of Culture and Arts (KNUKiM), 2021.

individual musical sound, which is realized through the appeal to the song folklore of different regions"[50]. The appeal to folklore motifs gives researchers grounds to talk about "opposition to cultural assimilation and globalization"[51] and "acquires the features of genre-style and semantic duality"[52].

Conclusion

Innovations in the music of the twentieth century were most clearly manifested in the harmonic and timbral spheres. The harmony of the music of the twentieth century is diverse and, depending on the creative guidelines of the author, can be characterized as extended tonal or polytonal (C. Debussy, M. Ravel, jazz music), modal or in combination of modal and tonal principles (O. Messiaen, B. Liatoshynsky) and atonal, in particular serial (A. Schoenberg, A. Berg, A. Verben) and serial. Some attempts to update the pitch organization of musical material concerned the introduction of micro-intervals within the tonal logic (A. Gaba), as imitation of sound spectra (J. Grise, T. Murray) or sonority (K. Penderecki).

The expansion of the timbral palette of musical art in the twentieth century was mainly due to the emergence of electric instruments that allowed synthesizing sounds that were unattainable for traditional instruments. By the end of the twentieth century, timbre, along with harmonic means, had become one of the most important means of musical expression, and in electronic music, a key distinguishing feature of its individual styles.

Innovations also concerned composers' work with folklore material. Unlike nineteenth-century composers, early twentieth-century composers tried to combine folk song melodies with the latest methods of harmonic and polyphonic development, and in the late twentieth century folklore also became a source of timbral enrichment for opera and symphonic music, and later (at the beginning of the twenty-first century) for electronic music.

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