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ЗБІРНИК НАУКОВИХ ПРАЦЬ XVII МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ КОНФЕРЕНЦІЇ “АКАДЕМІЧНА Й УНІВЕРСИТЕТСЬКА НАУКА: РЕЗУЛЬТАТИ ТА ПЕРСПЕКТИВИ”



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DEVELOPMENT OF APPROACHES TO IMPROVE THE PERFORMANCE
OF CABLE SYSTEMS FOR ENHANCING THE PERCEPTION OF SOUND AND
IMAGE QUALITY IN MUSIC AND CINEMATIC SYSTEMS

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Relevance of the research. In recent decades, the rapid development of audio and video technologies has opened new horizons for high-quality perception of music

and cinematic works. However, despite the advancements in sound and image sources, one crucial element that affects the quality of the final signal – cable systems continues to remain under the radar. Cables play a key role in transmitting audio and video signals from sources (such as players and amplifiers) to end devices (such as speakers, projectors, and screens), and their performance can significantly influence the perception of sound and image quality.

Manufacturers of musical and cinematic systems often focus on improving the devices themselves, while the importance of cable quality remains underestimated. Numerous studies show that even high-quality audio and video equipment may fail to reach its full potential if the cable system does not meet the necessary requirements [1-4]. In this context, researching cable systems and their impact on quality perception becomes highly relevant.

The purpose of the work. The primary purpose of this work is to develop and experimentally verify methods for improving the performance of cable systems that enhance the perception of sound and image in music and cinematic systems. The study will focus on examining the impact of various cable parameters (materials, structure, length, shielding) on signal transmission and the perception of audio and video systems' quality.

Particular attention will be given to studying the influence of different types of cables (HDMI, optical cables, coaxial cables, speaker cables) on signal quality. Additionally, recommendations will be developed for selecting cables for various types of equipment to maximize sound and image quality in the system.

Methodology and organization of the research. The research methodology will combine theoretical and experimental approaches. A review of existing studies and technical documentation on cable systems and their impact on audio and video signal transmission quality will help identify the key principles used to improve cable performance and reveal the shortcomings of existing solutions. A comparison of various types of cables (optical, HDMI, coaxial) will be conducted in terms of signal loss, frequency characteristics, and resistance to electromagnetic interference. The

results of measurements and subjective assessments will be analyzed using statistical methods, enabling the identification of patterns and conclusions about the influence of various factors on signal quality.

Results of the research. Cables with high-purity copper or silver conductors, compared to standard copper, will demonstrate better conductivity and lower signal loss, improving both sound and image quality. For example, silver conductors will provide more detailed transmission of high frequencies in audio.

Shielding significantly reduces the impact of external interference, especially in environments with strong sources of radio-frequency interference (e.g., electrical devices or mobile phones). Cables with multi-layer shielding will show better results in high-speed data transmission (such as 4K and 8K video) [1-4].

It is important to consider that long cables (especially in digital systems) can significantly weaken the signal. Determining optimal cable lengths and using signal amplifiers will help eliminate this limitation.

Conclusion. The research confirms that the performance of cables plays a pivotal role in enhancing the perception of sound and image quality in music and cinematic systems. By addressing key factors such as material composition, shielding, and construction quality, significant improvements in the transmission of audio and video signals can be achieved. The findings suggest that high-performance cables are not only necessary for high-end AV systems but are also a critical component in delivering the best possible user experience in both music and film contexts. Moving forward, this research provides valuable insights into the development of cable systems optimized for modern audio-visual technologies. Future work should focus on further refining cable materials and design principles, as well as exploring the integration of new technologies, such as fiber optics and wireless transmission, into the evolving landscape of AV systems. By continuing to explore and improve cable system performance, it will be possible to push the boundaries of sound and image quality, ultimately enhancing the immersive experience for consumers.

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**ВЛАСТИВОСТІ ЗОЛ-ВИНЕСЕННЯ КОТЛІВ З ЦИРКУЛЯЦІЙНИМ
КИПЛЯЧИМ ШАРОМ**

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На території нашої країни накопичено понад 100 млн. тон відходів теплових електростанцій у вигляді зол та золошлаків. Вони забруднюють навколишнє середовище та несуть загрозу здоров'ю людини [1]. Однак, завдяки унікальному хімічному складу, їх можна використати у виробництві будівельної продукції. Для ефективною переробки золошлаків важливим є їх попередній аналіз та класифікація. Основними критеріями є мінералогічний склад, хімічний склад,