

Title	音楽・音響再生の高度感性情報再現の評価に重要な評価語解析と無歪み伝送装置の実現で用いられたキー評価語に基づく物理要因・特性の発見及び総合評価-キー評価語-物理要因・特性の関係の実証に関する研究(-高度感性情報の再現に関する心理物理学的研究-)
Author(s)	石川, 智治
Citation	
Issue Date	2001-03
Type	Thesis or Dissertation
Text version	author
URL	http://hdl.handle.net/10119/905
Rights	
Description	Supervisor:宮原 誠, 情報科学研究科, 博士

Based on the transmission theory, the sound reproduction with an electric signal is studied. Therefore, it is the most important to realize the distortionless transmission that a sound system has the flat magnitude and constant group delay response.

In the conventional audio research, to pursue the fidelity of sound reproduction, the above electrical characteristic related with the hardware performance of a sound system is improved.

However, the high fidelity of sound quality is not realized, even if the electrical characteristic of a sound system is improved to obtain distortionless transmission. Because it is clear that the difference of sound quality is related with the physical factors of the vibration of the component parts and the suspension of a body of sound system and so on. They are shown the electrical characteristic beyond on the measurement limit. Therefore, it is impossible to show the electrical characteristic for the fidelity of sound quality.

We think the purpose of the conventional audio research is the sound reproduction for the information of a musical score. As the result, if the electrical characteristic of a sound system has improved to obtain distortionless transmission, the sound reproduction for the information of a musical score is achieved. Therefore the conventional audio research need not consider the physical factors related with the sound quality. We define the reproduction of shallow-sensation is the sound reproduction of the information of a musical score in the conventional audio research. In the fact, the reproduction of shallow-sensation is obtained.

On the other hand, the purpose of this research is the reproduction of deep-sensation (High Order Sensations) such as the deep and high-level artistic impressions. Therefore this research must consider the physical factors related with the sound quality.

Therefore, in this research (I) we must find the necessary precision of the electrical characteristic related with the physical factors, (II) we must find the physical factors related with the reproduction of High Order Sensations, (III) the sound system for considering the discovered electrical characteristics and physical factors are developed.

The approach is as follows.

- (1) The assessment words related with High Order Sensations are obtained by investigation, collection and grouping of many assessment words. Then we have obtained the correlation between the overall quality which is represented the assessment words and the key assessment words which discovered with many examinations.
- (2) The magnitude and group delay response of a conventional sound system are compensated to flat using a digital signal processor (DSP), and its effect on the sound quality is evaluated by the assessment words. Because human can transfer an emotion to a language, we have evaluated by the assessment words. As the results, the reproduction of shallow-sensation is improved. However the reproduction of deep-sensation is not improved and deteriorated. The result means that the reproduction of deep-sensation must consider the electrical characteristic related with the physical factors. Therefore, in the results of many examinations, we must find the electrical characteristic and the physical factors related with the reproduction of deep-sensation .

(2-a) Three electrical characteristics are discovered.

First, based on the fact that DSP hardware which is included in a sound system deteriorates a sound quality of High Order Sensations, we have discovered the jitter which is peculiar to digital audio. Moreover the total of jitter value of the electrical characteristic must be reduced within ns-order. In the conventional audio, the results can't believe. Second, in many examinations, based on the fact that the difference of the circuit of an amplifier relate with the reproduction of deep-sensation , we have discovered the reproduction of very lower frequency, that is, the a larger time constant of a feed back loop of a servo type main amplifier is important to obtain the reproduction of deep-sensation .

Third, the examination system didn't have the performance for reproduction of deep-sensations . Therefore the physical factors related with deep-sensation of the sound system is improved. As the results, we have discovered the physical factors; the strong power supply which can input the impulsive energy to the speaker.

(2-b) As the results of the same examination, we have discovered the physical factor; the control of vibration of the suspension of a body of a sound system.

(3) The relations of the assessment words and the electrical characteristics, and physical factors are obtained. The first

and second electrical characteristic of (2-a) related with the reproduction of atmospheric . The third electrical characteristic of (2-a) and the physical factor of (2-b) are the reproduction of degree of penetration into one s mind . The atmospheric and degree of penetration into one s mind are the key assessment words.

- (4) It is clear that there is a correlation between the key assessment words and over all quality by (1). We have confirmed the correlation between the key assessment words and over all quality by the assessment test. As the result, we have obtained relationship between the discovered electrical characteristic and physical factors, and over all quality.
- (5) The pilot sound system that is improved the discovered electrical characteristics and physical factors, is developed. Then, we have assessed the sound reproduction of the pilot system. The results are obtained the reproduction of deep-sensation . Therefore the discovered electrical characteristic and physical factors is important for the reproduction of deep-sensation .

Conclusion of this research;

To obtain the reproduction of deep-sensation , it is the most important that a sound system has the flat magnitude and constant group delay response. However, if the discovered electrical characteristic and physical factors are not improved, the reproduction of deep-sensation is deteriorated. Therefore it is more important that the discovered electrical characteristic and physical factors are improved. It is clear that the three pilot systems that are improved the discovered electrical characteristic and physical factors can the reproduction of deep-sensation .