

# Philosophy and Medical Efficacies of Lambdoma Matrix

## Harmonic Music

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### ABSTRACT

Music can help the health of humans, such as medical resonance therapy music (MRTM). The Mozart effect is a philosophy of medicine. Listening to high-frequency music, which contains a dominant Solfeggio Frequency of 528 Hz, can promote the health of the human body. Therefore, by the assessment preliminary spectra distribution, Lambdoma Matrix Harmonic Music (LMHM) should have the philosophy and medical efficacies similar to that of the Mozart effect and the medical efficacy of solfeggio frequency. For this reason, a Musical Spectrum Analysis and Pearson correlation coefficients are used into the spectra of The LMHM, Protein Music, MRTM, Guqin Music, Heart Sutra, Silent Night, Surah Al Waqiah and Mozart-Sonata. The LMHM, within the range of 4-200 Hz, should own the previously described philosophy and medical efficacies. However, broader medical efficacy of LMHM requires more treatment cases for verification.

**KEYWORDS:** Medical Resonance Therapy Music (MRTM); Mozart Effect; Solfeggio Frequency; Lambdoma Matrix Harmonic Music (LMHM); Musical Spectrum Analysis

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## 1. INTRODUCTION

Music is already an ancient method for healing. Recently, music therapies (as a kind of psychotherapy) have become popular and can help the body and mental and spiritual health of human beings. Many corresponding official studies have been published to discuss this issue (Huang and Huang, 2023; Park et al., 2023). A kind of music is first described. It is so-called protein music. Protein Music is composed of protein sequences, genes, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) (Yu et al., 2019; Yu and Buehler, 2020; Martin et al., 2021; Su and Zhou, 2024). Proteins are structured like folded chains. These chains are made up of small units of 20 possible amino acids, and each label has a letter of alphabet. Thus, some protein-to-music algorithms can map structural and physiochemical features of a string of amino acids into musical features of a string of musical notes. Protein music can be treated as a kind of music of the human body and is a type of physiological music (i.e., the sound of the human body). Therefore, protein music can be a type of therapeutic music for the human body; for example, listening to such music can decrease the speed of tumor formation in breast cancer

cells (Orhan and Gulbahar, 2016). In contrast to creating styles of general music (e.g., pop music), mathematical music is created using mathematical principles to research elements of music. These mathematical principles are generally referred to as musical mathematics. Musical mathematics applies set theory, abstract algebra and number theory to compose mathematical music with tempo, chord progression, form, and meter. Ancient Chinese, Indians, Egyptians and Mesopotamians have studied the mathematical principles of sound. In particular, the mathematical music of Pythagoreans is famous (Pythagoras of Samos, ca.570 BC–495 BC, an ancient Ionian Greek philosopher, polymath and the eponymous founder of Pythagoreanism) (May 2020; Lu et al., 2022; Azaryahu et al., 2023).

A type of mathematical music is Lambdoma Matrix Harmonic Music (LMHM), with the sound and frequency of the five planets, i.e., Jupiter, Mars, Saturn, Venus and Mercury. The five planets are a concept of Wuxing (will be explained later). The LMHM is created through Pythagorean Lambdoma Harmonic Keyboard (PLHK) (**Figure 1a**) on the basis of the mathematical principle of Pythagoras. The design concept of the PLHK is based on a Lambdoma matrix (LM) with four quadrants, as shown in **Figure 1b**. In this figure, the numbers “1, 2, 3 and 4” indicate the quadrant number. The first quadrant is the origin of the fundamental tone (fundamental frequency) (i.e., an element with a ratio of 1:1), and the other quadrants are the origins of overtones. The LM originated in ancient Egypt and was popular in ancient Greece. The frequency and sound of the LMHM are the parameters derived from the LM; therefore, they are not the real frequency and sound of the five planets. The LM is not the matrix currently used. The rows are based on the fractions representing different musical harmonic scales, and the columns contain divisors called subharmonic scales. Two basic elements, frequency and harmony, are provided by musical mathematics and constitute the fundamental concept of the LMHM. Therefore, the LMHM can promote the health of human beings through flexible application of these two elements (Hero, 1978; Hero and Foulkrod, 1999; Hero and Foulkrod, 2000; Hero, 2002; Hero, 2007; Hero and Martinez, 2005). In addition, the medical resonance therapy music (MRTM) of Peter Hübner (Peter Hübner is a German musician), which will be analyzed in this study, is also based on the mathematical principle of Pythagoras for medicine (Sidorenko, 2000a). Therefore, the LMHM and MRTM are mathematical music that belongs to Pythagorean (Crocker, 1963).

Hero and Foulkrod (1999) confirmed that the LMHM can affect the physical, emotional, and mental states of some hospitalized patients (i.e., the effectiveness of music interventions in stress management) from the outcome of a recreation therapy program by the National Institutes of Health (NIH). MRTM is already recognized as good therapy music (Lazaroff and Shimshoni, 2000; Sidorenko, 2000a, 2000b, 2000c). Lazaroff and Shimshoni (2000) reported that emotional disharmony is an important factor for skin diseases. After treatment with MRTM, the results revealed that the blood pressure and heart rate were reduced, and then, an enhanced reduction in the stimulus to scratch was revealed, and the degree of sickness was clearly reduced.

Sidorenko (2000a) reported that MRTM can be applied to pregnant women, and after application, the rate of premature births is effectively reduced. Sidorenko (2000b) investigated children with transient arterial hypertension after a nuclear accident at Chernobyl. After application of the MRTM to these children, a good sympatholytic effect is demonstrated so that the healthy age norm with a hemodynamic state is reached. Sidorenko (2000c) evaluated the effectiveness of the MRTM for severe epileptic patients. After treatment, 80% of these patients experienced positive changes in the frequency of paroxysms, and their frequency of occurrence was reduced to 75%. Therefore, the MRTM is internationally recognized as a type of good therapeutic music. However, LMHM is not widely used in music therapy.

Wuxing is a type of Chinese philosophy and is formed with five elements (i.e., WOOD, FIRE, EARTH, METAL and WATER) that indicate the five planets (i.e., Jupiter, Mars, Saturn, Venus and Mercury). The WOOD element is in the east, the METAL element is in the west, the FIRE element is in the south, the WATER element is in the north, and the EARTH element is in the middle. The five elements are associated with generating interactions and overcoming interactions (Wang, 2019; Zhang et al., 2020; Yang, 2023). They indicate the spatial orientation and direction of the movement of the five elements and are a kind of astronomical and philosophical perspective in ancient China (Morgan, 2016). Wuxing also maps to the structure of human beings (Albegov et al., 2010; Zhang, 2020). Therefore, the application of Wuxing can help the health of human beings (Chen, Y. J., 2022; Bătcă and Simionescu-Panait, 2023; Feng et al., 2023). Wuxing is mapped into the five music notes of Chinese music (e.g., Guqin Music), i.e., Gong, Shang, Jue, Zhi and Yu, which indicate EARTH, METAL, WOOD, FIRE and WATER, respectively. Therefore, Chinese music is a kind of Wuxing Music (e.g., Guqin Music is a kind of Wuxing Music) (Huang and Lin, 2014) and can promote the health of human beings (Fung et al., 2019; Li et al., 2022; Qi et al., 2023). Religious music can influence human beings in terms of mindfulness-based stress reduction (e.g., by eliciting good emotions and mood) and release psychological stress (Bradshaw et al., 2015; Lang et al., 2016; Husgafvel, 2018; Malviya et al., 2022). For the organ resonance frequencies of the human body, different organs correspond to different resonance frequencies (Duarte and Pereira, 2006). For example, the resonance frequencies of organs for humans are shown in **Figure 2**. If the frequency component (i.e., within the range of 4–200 Hz) of therapy music corresponds to the frequencies of human organs, then such music should theoretically promote body health through resonance with organs.

## **2. OBJECTIVE**

In this study, some music will be analyzed: **(1)** the LMHM, **(2)** protein music, **(3)** MRTM (for emotion relaxation), **(4)** Guqin music, **(5)** Heart Sutra (a scripture of Buddhism) (Sheean, 1951), **(6)** the Silent Night (a classical song of Christianity and Catholic), **(7)** Surah Al Waqiah (the 56th surah in the holy Quran of Islam) and **(8)** Mozart-Sonata for Two Pianos in D major, K448 (2nd movement).

Afterward, Mozart-Sonata for Two Pianos in D major, K448 (2nd movement), is abbreviated as Mozart-Sonata. Among them, Guqin music is Wuxing Music. Heart Sutra, Silent Night and Surah Al Waqiah are religious music. Mozart-Sonata is classical music and is a form of psychological music (López-Íñiguez and McPherson,

2021). However, in this study, the philosophy and medical efficacy of the LMHM are researched through comparisons with other analyzed music because it is relatively unfamiliar to humans and even strange music. The time domains (or temporal domains) of analyzed music are very different. Therefore, for the objective, a musical spectrum analysis (i.e., transforming into frequency domains or spectral domains) and Pearson correlation coefficients will be performed to confirm whether the LMHM within the range of 4-200 Hz (based on the frequency range of the organs in **Figure 2**) contains the information of other analyzed music in this study.

It follows from this, the philosophy of physiology, psychology, Wuxing and religion in the LMHM within this frequency range will be imported. The Mozart effect is a philosophy of medicine. Specifically, listening to the music of Mozart (i.e., Mozart-Sonata) can promote human physical and spiritual health. The original study reported a short-term improvement in the performance of certain kinds of mental tasks. This is known as spatial reasoning, such as folding paper and solving mazes (Rauscher et al., 1993). Listening to Mozart-Sonata can improve short-term memory and concentration (Limiyati, et al., 2019). Some corresponding official studies have researched this effect (Jenkins, 2001; Pauwels et al., 2014; Verrusio et al., 2015; Oberleiter and Pietschnig, 2023). In addition, listening to high-frequency music, which contains a dominant solfeggio frequency of 528 Hz, can also promote the health of the human body (Akimoto et al., 2018; Daylari et al., 2019; Bando et al., 2023; Heti and Yeshaswini, 2024). This is the medical efficacy of the solfeggio frequency. Therefore, the effects of Mozart and the medical efficacy of solfeggio frequency have already been affirmed.

### **3. METHOD**

A Musical spectrum analysis was used as a tool for the analyzed music in this study. Therefore, the analyzed music will be transferred into the frequency domains (i.e., spectra). The spectra of the LMHMs of Jupiter, Mars, Saturn, Venus and Mercury are shown in **Figure 3**. The spectra of Protein Music, MRTM, Guqin Music, Heart Sutra, Silent Night and Surah Al Waqiah are shown in **Figure 4**. The spectrum of Mozart-Sonata is shown in **Figure 5**. The spectra in Figs. 3-5 are compared within the range of 4-200 Hz via Pearson correlation coefficients (PCCs) (Saccenti et al., 2020; Shantal et al., 2023). The high similarities within this frequency range of the analyzed music will be confirmed.

### **4. RESULT**

The PCCs between Protein Music and the LMHMs of Jupiter, Mars, Saturn, Venus and Mercury are 0.84, 0.89, 0.83, 0.82 and 0.80, respectively. The PCCs between Protein Music and the MRTM, Guqin Music, Heart Sutra, Silent Night and Surah Al Waqiah are 0.83, 0.80, 0.88, 0.84 and 0.81, respectively. Owing to the high positive values of the PCCs, the LMHM, protein music, MRTM, Guqin Music, Heart Sutra, Silent Night and Surah Al Waqiah have high similarity within this frequency range. The PCCs between Mozart-Sonata and the LMHMs of Jupiter, Mars, Saturn, Venus and Mercury are 0.81, 0.83, 0.87, 0.82 and 0.81, respectively. They also have high similarity within this frequency range. Within other frequency ranges of the analyzed music, the PCCs are used, and the similarities are very low between the LMHM and the other analyzed music (<0.5).

## **5. DISCUSSION**

Recently, some researchers have confirmed that low-frequency music can indeed promote the health of human beings (e.g., benefits including slowing heart rate, promoting relaxation and treating depression) (Naghdi et al., 2015; Halbert et al., 2018; Eshuis et al., 2021; Vilimek et al., 2022). Therefore, listening to the LMHM within the range of 4–200 Hz should theoretically improve the body, mental and spiritual health of humans. This means that the interaction between organs and the LMHM within this frequency range can form a resonance relationship (Figure 2). This relationship can affect the body, mind and soul of a human being so that a healthy body, mind and soul can be reached. From the PCCs in the spectra of the analyzed music of this study, the LMHM within the range of 4-200 Hz contains the information of other analyzed music. As a result, the LMHM, within this frequency range, has the philosophy of physiology, psychology, Wuxing and religion and should have medical efficacy. However, LMHM outside this frequency range cannot be confirmed to have medical efficacy. Nevertheless, when the LMHM is used as a type of therapeutic music, the LMHM, over the entire frequency range, has been confirmed to have healing effects on the body, mind and soul, such as the effectiveness of music interventions in stress management (as stated previously) (Hero and Foulkrod, 1999) and the improvement of sleep quality (Lin, 2024). Consequently, by the assessment preliminary spectra distribution, the LMHM, over the entire frequency range, should theoretically have medical efficacy similar to that of the Mozart effect and the medical efficacy of solfeggio frequency. Hero and Foulkrod (1999) and Lin (2024) have already indicated the preliminary medical efficacies of the LMHM. Therefore, the previously described philosophy and medical efficacy should be reasonable and acceptable. Further, the LMHM may have Mozart effect; efficacy of the solfeggio frequency.

However, broader medical efficacy of the LMHM still requires more treatment cases (i.e. psychotherapies) to verify (e.g., for a certain disease, such as insomnia), so that the LMHM can become a kind of psychological therapy music, which can be a part of complementary and alternative medicine similar to e.g. the applications of Frequency-Specific Microcurrent (FSM) and reminiscence therapy based on the seed mode, in which the functions of music are described, to human health (McMakin and Oschman, 2013; Engelbrecht et al., 2021). Nevertheless, in this study, the preliminary requirements for the objective have been achieved. Additionally, whether the previously described philosophy can belong to a type of philosophy (e.g., philosophy of music), this needs some future some research tools (<https://plato.stanford.edu/entries/music/>) (<https://iep.utm.edu/music-an/>).

## **6. CONCLUSION**

The spectra of LMHM, Protein Music, MRTM, Guqin Music, Heart Sutra, Silent Night, Surah Al Waqiah and Mozart-Sonata show high similarity within the range of 4-200 Hz via the PCCs. Therefore, the LMHM within this frequency range contains the information of other analyzed music of this study. Protein music is a type of physiological music. MRTM is already recognized as good therapy music. Guqin music is a kind of Wuxing Music. Heart Sutra, Silent Night and Surah Al Waqiah are a kind of religious music. Mozart-Sonata is a form of psychological music. As a result, the LMHM within this frequency range has the philosophy of physiology, psychology, Wuxing and religion and should have medical efficacy. LMHMs outside this frequency range

cannot be confirmed to have medical efficacy. However, when the LMHM is used as a type of therapeutic music, the LMHM, over the entire frequency range, has already been confirmed to have healing effects on the body, mind and soul, such as the effectiveness of music interventions in stress management and improving sleep quality. Consequently, by the assessment preliminary spectra distribution, the LMHM should theoretically have medical efficacy similar to that of the Mozart effect and the medical efficacy of solfeggio frequency. However, broader medical efficacy of LMHM requires more treatment cases for verification. Whether the previously described philosophy can belong to a type of philosophy, this needs some future some research tools.

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- (1) All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.
- (2) The author declares that there are no conflicts of interest.
- (3) Informed consent was obtained from all individual participants involved in the study.
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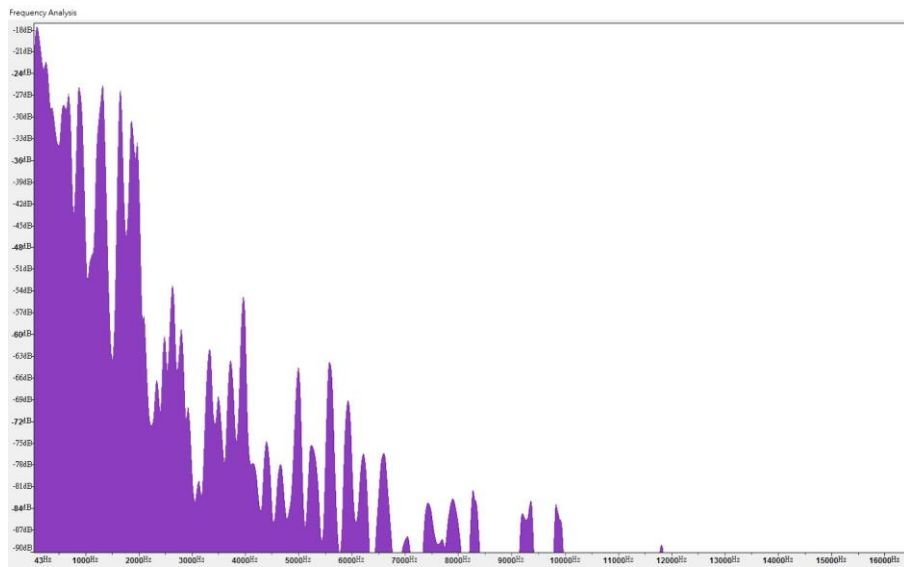
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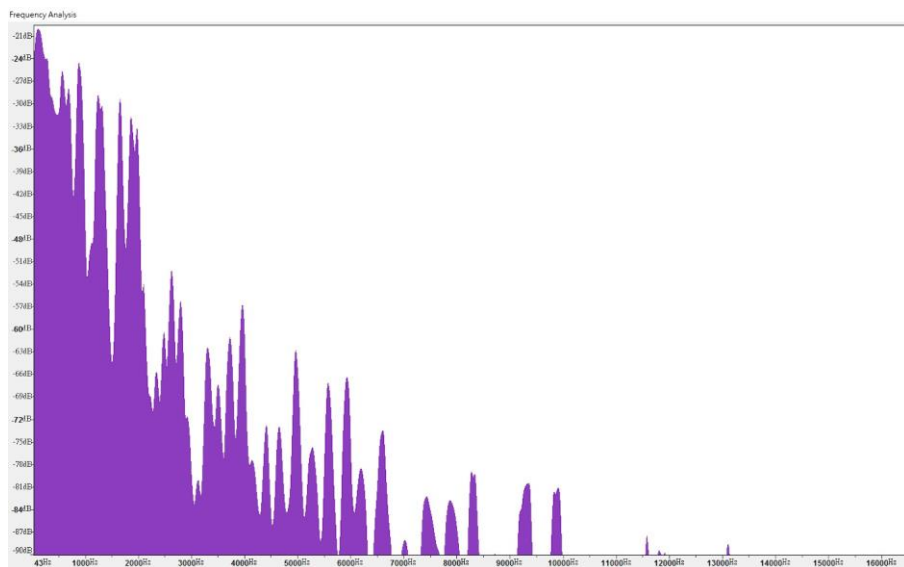
**Figure 1:** (a) Pythagorean Lambdoma Harmonic Keyboard (PLHK) based on the mathematical principle of Pythagoras of Samos (b) Lambdoma Matrix (LM) (Hero and Martinez, 2005) with four quadrants. In this figure, the numbers 1, 2, 3 and 4 indicate the quadrant number. The first quadrant was the origin of the fundamental tone (i.e., the element with a ratio of 1:1), and the other quadrants were the origins of the overtones.

Organs	Resonance Frequencies (Hz)
Head	20 to 40
Spinal Column	8
Chest Wall	60
Abdominal	4 to 8
Shoulders	4 to 8
Lungs	4 to 8
Hands and arms	20 to 70
Ocular globe	60 to 90
Maxilla	100 to 200

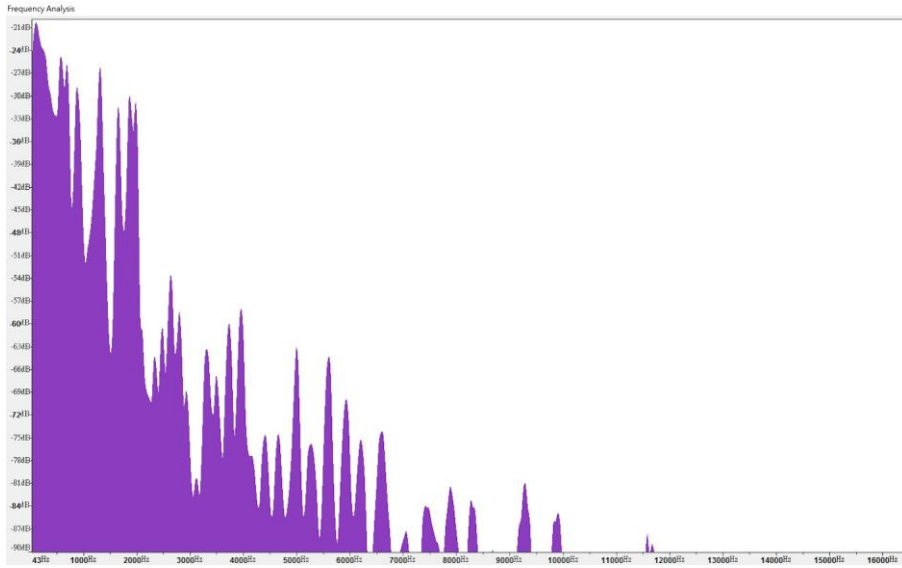
**Figure 2:** Resonance frequencies of organs in humans (Duarte and Pereira, 2006).



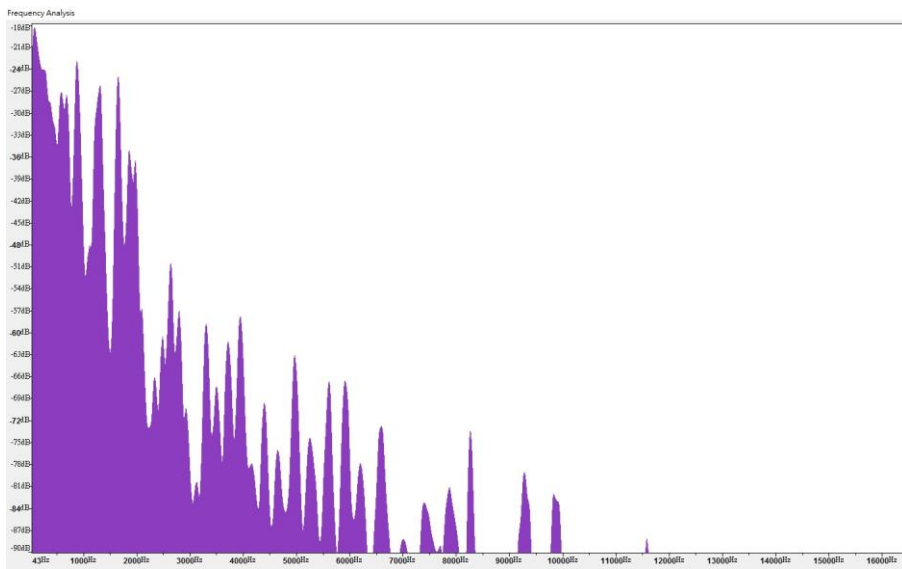
(a)



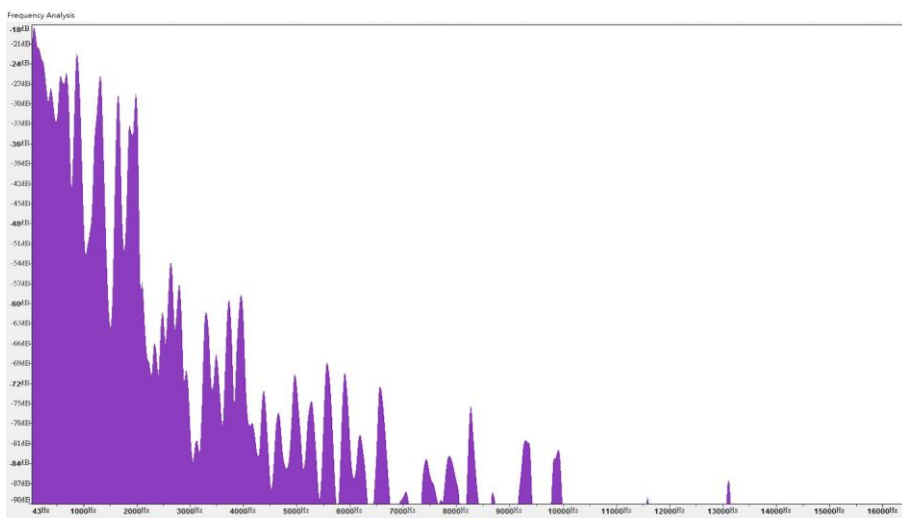
(b)



(c)

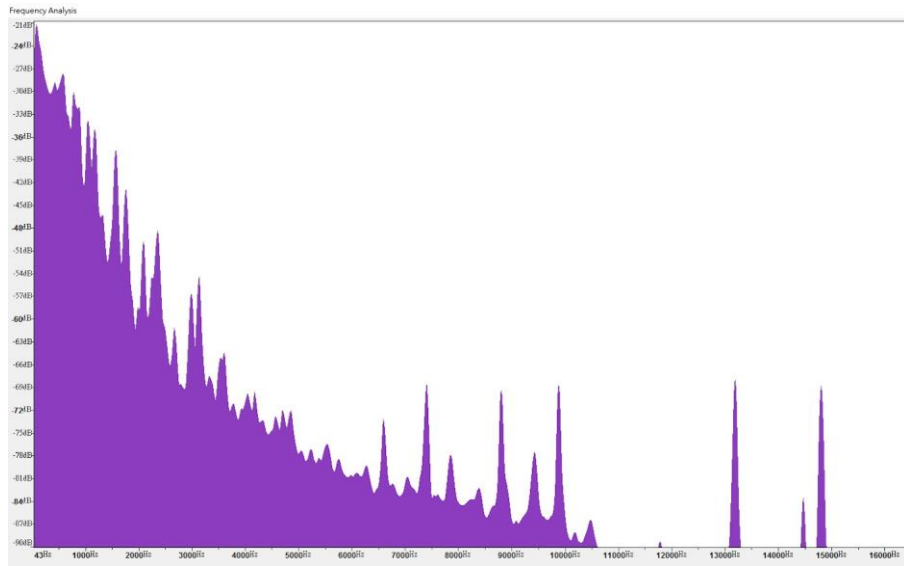


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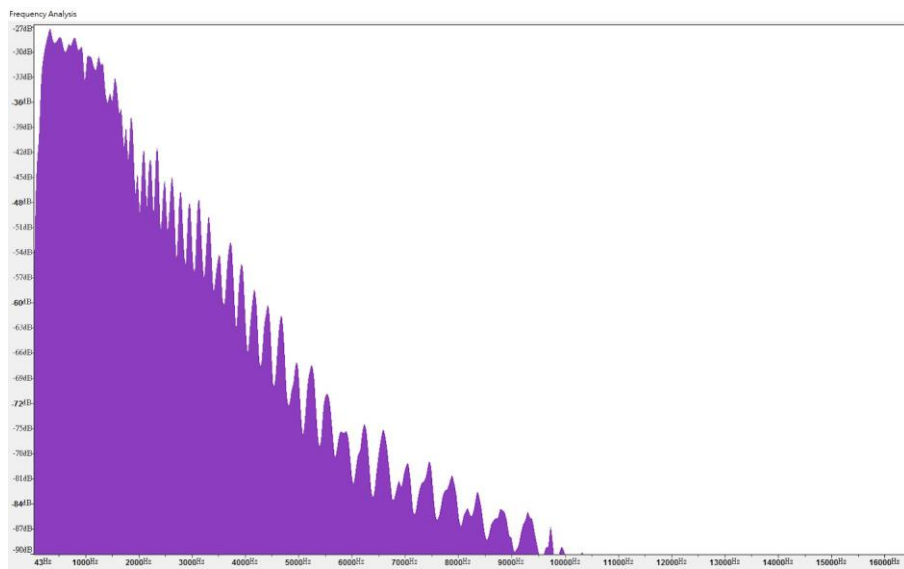


(e)

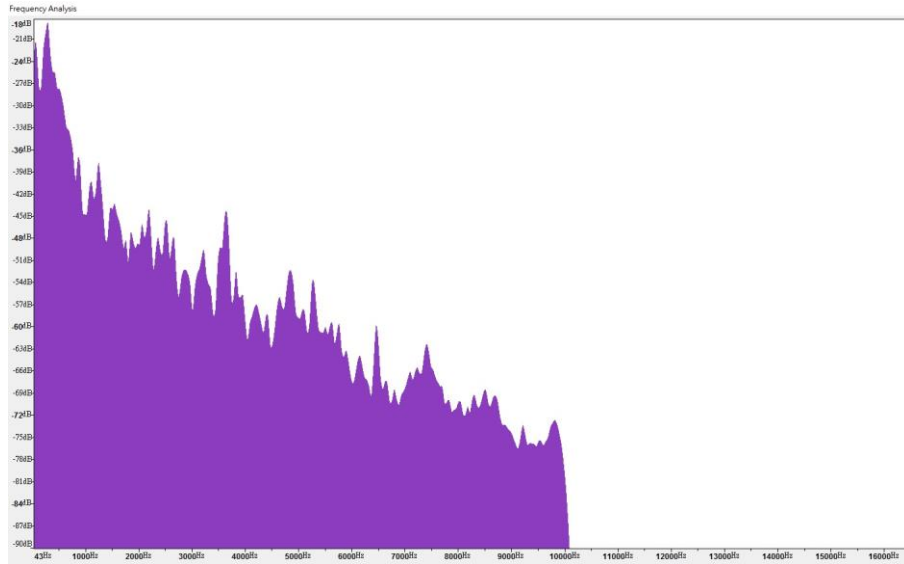
Figure 3: Spectra of Lambdoma Matrix Harmonic Music (LMHM): (a) Jupiter. (b) Mars. (c) Saturn. (d) Venus. (e) Mercury (<https://lambdoma.org/en/products/>).



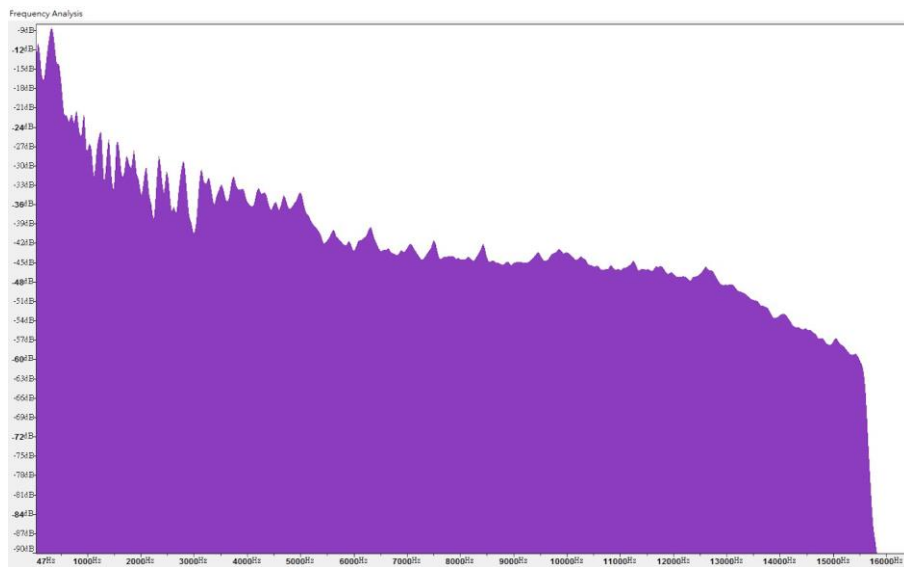
(a)



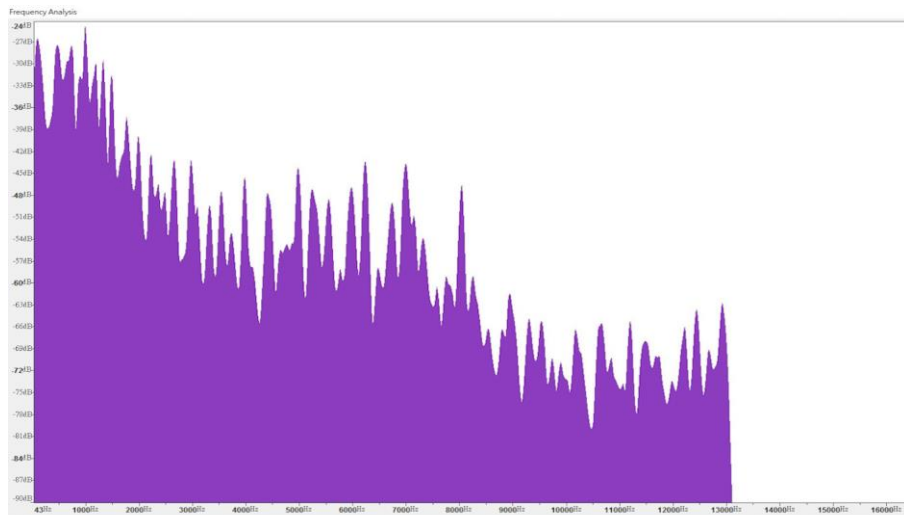
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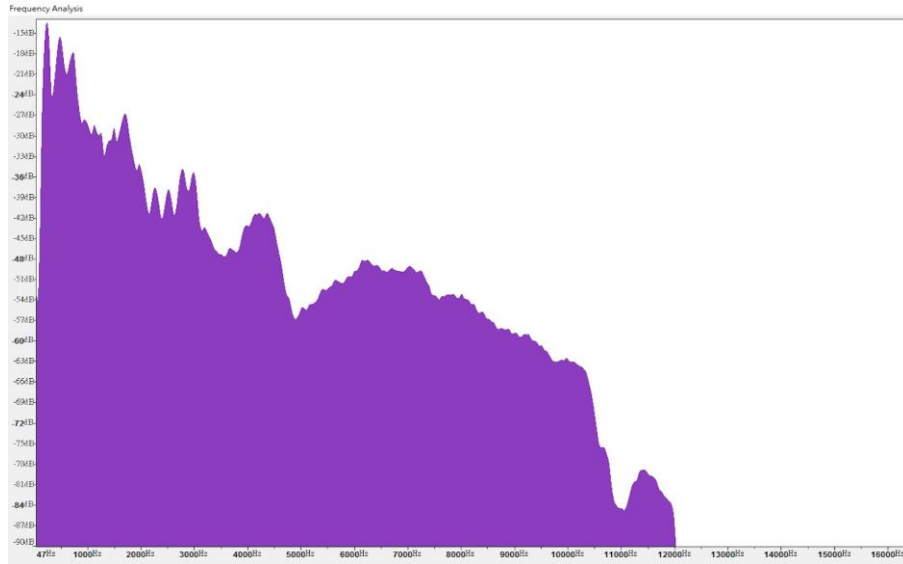
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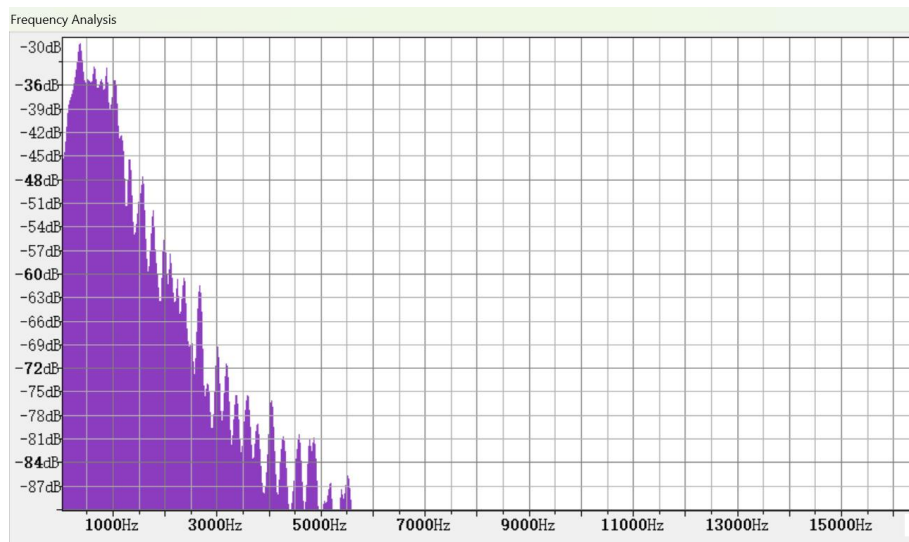


(e)



(f)

**Figure 4:** The spectra of the 6 types of comparative therapy music used in this study: **(a)** protein music (Sound Atoms, @soundatoms2556). **(b)** Medical resonance therapy music of Peter Hübner (for emotional relaxation) (PDB International, Inc, New York USA). **(c)** Guqin Music (Song of the Crouching Dragon: Depicting Zhuge Liang's soundtrack in the Romance of the Three Kingdoms in ancient China) (SuriSmile @surismile6898). **(d)** Heart Sutra (singing by Sheryl Huang, a singer in Taiwan) (Chinese language). **(e)** Silent Night (Intellectual Reserve, Inc.). **(f)** Surah Al Waqiah (Al Quran, @alquran6635).



**Figure 5:** The spectrum of Mozart-Sonata for Two Pianos in D major, K448 (2nd movement).