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Research Article

A study on Bernard Herrmann's science fiction film music[1]

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Abstract

The early sound film and "classical-style" Hollywood film periods were important representatives in the history of Hollywood films, producing many classic films as well as many famous film music composers. Among them, Bernard Herrmann was a unique and distinctive representative with his own personal compositional style, and was also the representative composer for thriller, horror, mystery and science fiction films during this period. When analyzing film music, especially Bernard Herrmann's works, using tonal music analysis, many harmonic progressions cannot be accurately expressed. Harmonic function analysis emphasizes the principles of tonality, while neo-Riemannian theory breaks away from the framework of tonality and harmonic functions, emphasizing the spatial progression between chords. For Bernard Herrmann's music, using neo-Riemannian theory can reasonably analyze the characteristics and patterns of musical progression, and explain many chord progressions that harmonic functions cannot. One of the films that can be given as an example of this situation is The Day the Earth Stood Still (1951). The Day the Earth Stood Still is a Hollywood science fiction film made in 1951. This work played an important role in the development of later science fiction films. Bernard Herrmann chose to abandon the traditional orchestral instrumentation and used a specific instrumental ensemble to form Herrmann's unique science fiction film music space. Transformational analysis shows that the music uses modes, hexatonic scales and octatonic scales to form melodies and harmonies with ambiguous characteristics, and the use of these modes and scales also provides important color elements for film music of specific styles. Neo-Riemannian theory has been around for less than 50 years. As an emerging music theory system, it is not yet mature and complete, and is still expanding and improving. However, as an analysis tool for nonfunctional tonal film music, it can provide a brand new perspective. This researcher also believes that neo-Riemannian theory can provide theoretical basis for analyzing various styles of film music as an analytical tool.

Keywords

Bernard Herrmann, film music, film score, neo-Riemannian theory, triadic transformations

Introduction

The Day the Earth Stood Still is a 1951 American science fiction film directed by Robert Wise (1914-2005). It tells the story of a visitor from outer space who comes to Earth to warn humanity of the danger of nuclear war. Composer Bernard Herrmann (1911-1975) created an atmosphere of tension and suspense through the orchestra and electronic music, building the uneasy mood of the film. Herrmann's compositional concepts and sound design made important contributions to the development of film music. His compositions were different from most other composers at the time. When other composers were using lavish classical compositional techniques, he began using minimal melodies, minimal modular phrases, blurred tonal harmonies, moved away from Romantic textures and orchestrations, and made extensive use of non-traditional classical instrumentation. These characteristics are all specifically reflected in the music for this film.

[1] This study was produced from Johee Lee's PhD thesis.

There is a diversity in the composition and analysis of film music. Based on the music of the Romantic period, film scores have incorporated impressionism, neo-classicism, contemporaryism and other creative methods in the development process. From the 1930s to the 1950s, Hollywood created many science fiction films. In addition, composers paid more attention to the timbre of instruments and harmonic colors in the music of science fiction films. While a large amount of music cannot be reasonably explained through tonal music analysis. By Neo-Riemannian theory, it can explain the analysis of this type of music reasonably. The Day the Earth Stood Still is a 1951 American science fiction film directed by Robert Wise (1914-2005). It tells the story of a visitor from outer space who comes to Earth to warn humanity of the danger of nuclear war. Composer Bernard Herrmann (1911-1975) created an atmosphere of tension and suspense through the orchestra and electronic music, building the uneasy mood of the film . Herrmann's compositional concepts and sound design made important contributions to the development of film music. His compositions were different from most other composers at the time. When other composers were using lavish classical compositional techniques, he began using minimal melodies, minimal modular phrases, blurred tonal harmonies, moved away from Romantic textures and orchestrations, and made extensive use of non-traditional classical instrumentation. These characteristics are all specifically reflected in the music for this film.

Neo-Riemannian theory is a music analytical theory that emerged in the United States since the 1980s. This theory was originally developed to analyze and explain the chromatic harmonies in the music of Wagner during the Classical/Romantic period. As research on neo-Riemannian theory progressed, it began to expand into the field of film music analysis. The application of neo-Riemannian theory in film music analysis has been an ongoing exploration and development in Western academia.

Neo-Riemannian theory arose in response to analytical problems posed by chromatic music that is triadic but not altogether tonally unified (Cohn, 1998). This precisely matches the characteristics of film music, therefore this theory can provide reasonable theoretical support for analyzing film music. Neo-Riemannian theory proposes 6 basic concepts, triadic transformations, common-tone maximization, voice-leading parsimony, "mirror" or "dual" inversion, enharmonic equivalence, and the "Table of Tonal Relations"(Cohn, 1998), plus tonnetz, networks, graphs and other expressions to constitute a huge theoretical system. Among them, triadic transformations are the core of neo-Riemannian theory, mainly focusing on the movement between major and minor triads. It breaks free from the shackles of tonality and functions, emphasizing the transformation between musical elements consisting of harmonies. Composer Irwin Bazelon wrote that "film music is impatient. It has a function to perform and must make its presence felt without procrastination" (1975, 51). The immediate juxtaposition of two major or minor triads can fit this bill well, particularly when the juxtaposition is atypical (Murphy, 2013).

Problem of Study

Through research, it is found that currently in Asian academia, there are already some research papers and literature on applying neo-Riemannian theory to analyze classical music. But most are based on researching classical music and contemporary music, while analysis of film music is still in the preliminary stage. In particular, there is no detailed research yet on analyzing specific film music styles or specific composers.

Representative papers and literature in Western academia that apply neo-Riemannian theory to research film music analysis include Frank Lehman's "Reading Tonality Through film: Transformational Hermeneutics and the Music of Hollywood"

(2012), "Transformational Analysis and the Representation of Genius in film Music" (2013), and "film Music and Neo-Riemannian Theory" (2014). A large number of papers give detailed theoretical explanations of how neo-Riemannian theory can be applied in film music analysis, and summarize the characteristics of neo-Riemannian theory in analyzing film music as harmonic combinatoriality, parsimony, tonal agnosticism, and spatiality through analyzing excerpts of film music (Lehman, 2018).

Scott Murphy's "Transformational Theory and the Analysis of film Music" (2013) and Andrew S. Powell's "A Composite Theory of Transformations and Narrativity for the Music of Danny Elfman in the films of Tim Burton" (2018) and other papers conduct extended and expanded research on analyzing film music with neo-Riemannian theory. Especially, the TTPCs theory summarized by Scott Murphy provides theoretical basis for analyzing film music. Carl-Henrik Buschmann's paper "The Musical Conventions of Star Trek - A Search for Musical Syntax in Science Fiction" (2015) uses neo-Riemannian theory to analyze the film music of the specific Star Trek series. Especially the use of networks and graphs demonstrates well the accuracy and intuitiveness of neo-Riemannian theory in the analysis process. Currently there is no related musical analysis on Bernard Herrmann's this work, and this research will use neo-Riemannian theory to analyze and discuss it.

Method

Research Model

This study will use the following two-part method to analyze the work.

First, analyze the instrumental composition and related musical characteristics in conjunction with an introduction to the scene in the film. Use reduction in the form of Roman numerals to analyze the harmony, and organize the chord progression in charts.

Secondly, the neo-Riemannian transformational theory is used to analyze and mark the chord progression, and then the transformational network and graph is used to show the circulation path of the chord progression.

Analysis Techniques

The neo-Riemannian theory consists of various huge branching theoretical systems. In 1880, Hugo Riemann (1849-1919) proposed in Skizze einer neuen Methode der Harmonielehre, where the movement method that transforms between major or minor triads, can be summarized in harmonieschritte, a movement method that transforms between major or minor triads : Parallel, Leittonwechsel, Variante, and later theorists such as David Lewin, Richard Cohn, Jack Douthett, Peter Steinbach, and Frank Lehman organized extended theories in Table 1 below, which will be used to analyze this work.

Table 1. A summary of common transformations

The names of transformations	The method of transformation
P(arallel) Is equivalent to Riemannian transformations V(ariante)	➢ root and fifth remain unchanged ➢ third semitone changes
L(eittonwechsel)	➢ third and fifth remain unchanged ➢ root semitone changes
R(elative) Is equivalent to Riemannian transformations P(arallel)	➢ root and third remain unchanged ➢ fifth Whole-tone changes
M is the combined of L, R, P transformation.	L+R+P
N is the combined of P, L, R transformation.	P+L+R
H is the combined of L, P, L transformation.	L+P+L
LP	L+P
PR	P+R
LR	L+R

Analysis of Danger

The film content shows an extraterrestrial spacecraft gliding swiftly past the U.S. Capitol and the White House, its lights twinkling. It finally lands on a lawn, sending picnickers and others fleeing in terror. The emergency prompts government officials to race to the White House to brief the President. In the film, the scene is about people's panic in the face of emergencies, and the language of the music also creates a terrifying atmosphere through continuous nonfunctional chord progressions of minor chords.

The score and chord symbols arranged using reduction are shown in Figure 1 below

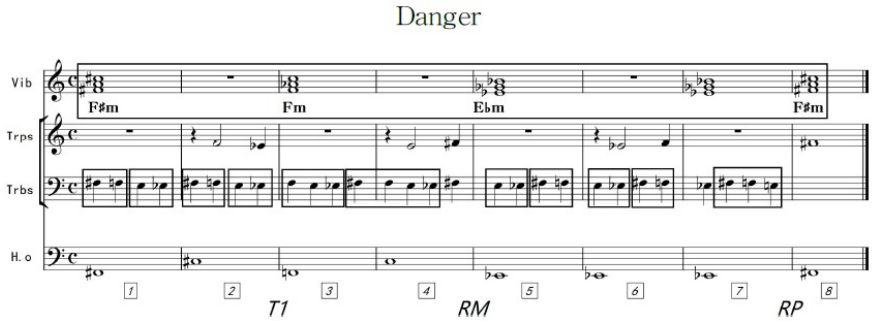

Figure 1. Bernard Herrmann, 'Danger', *The Day the Earth Stood Still*: harmonic reduction

Chord progression, Transformational Network and Graph are shown in Table 2 and Figure 2 and Figure 3 at the bottom, respectively.

Table 2. Bernard Herrmann, 'Danger', *The Day the Earth Stood Still*: chord

Measure	1	2	3	4	5	6	7	8
Chord	F♯m	F♯m	Fm	Fm	E♭m	E♭m	E♭m	F♯m

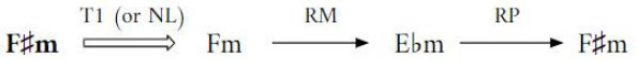

Figure 2. Bernard Herrmann, 'Danger', *The Day the Earth Stood Still*: network

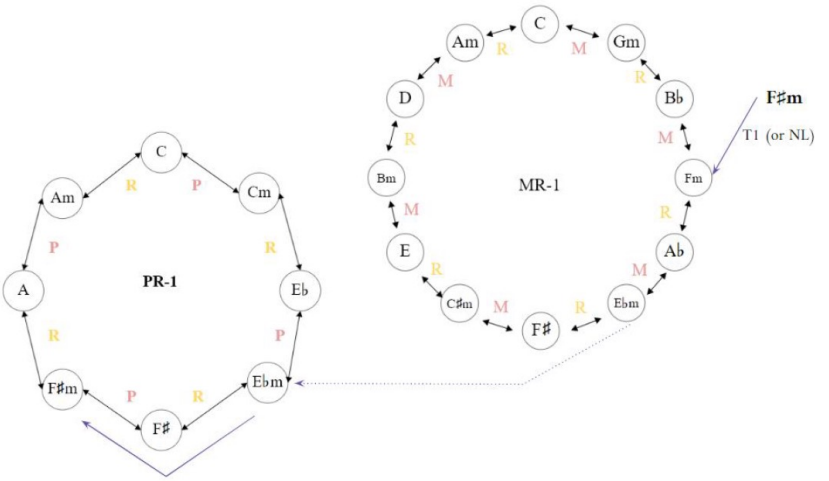

Figure 2. Bernard Herrmann, 'Danger', *The Day the Earth Stood Still*: graph

From the analysis above, it can be seen that the instrumentation consists mainly of vibraphone, trumpet, trombone and organ. The harmonic structure is an atonal music structure. Although the vibraphone starts and ends on F#m, the music does not follow the harmonic structure of tonal F#m music. The vibraphone moves in 2nd interval through the harmony F#m → Fm → E♭m → F#m, giving an unpredictable feeling, just like the film where the intentions of the visiting extraterrestrial spacecraft are temporarily unpredictable. The trombone also moves in semitones, highlighting the expression of unease and tension.

Analysis of Lincoln Memorial

The film is about Klaatu and Bobby entering Lincoln Memorial and seeing President Lincoln's speech on the wall of the memorial, praising him for writing it well, and saying that President Lincoln is the kind of person he wants to talk to. Klaatu then asked Bobby who was a great philosopher and thinker, and Bobby recommended Professor Barnhardt. In the film, the scene is an atmosphere of heroism and peace. The melody is composed of non-diatonic logics, while the harmony does not follow the attributes of tonality. The choice of instruments is more about brass, which expresses peaceful and mysterious heroism.

Score and chord symbols arranged using reduction are shown in Figure 4 below, and chord progression is in Table 3 below

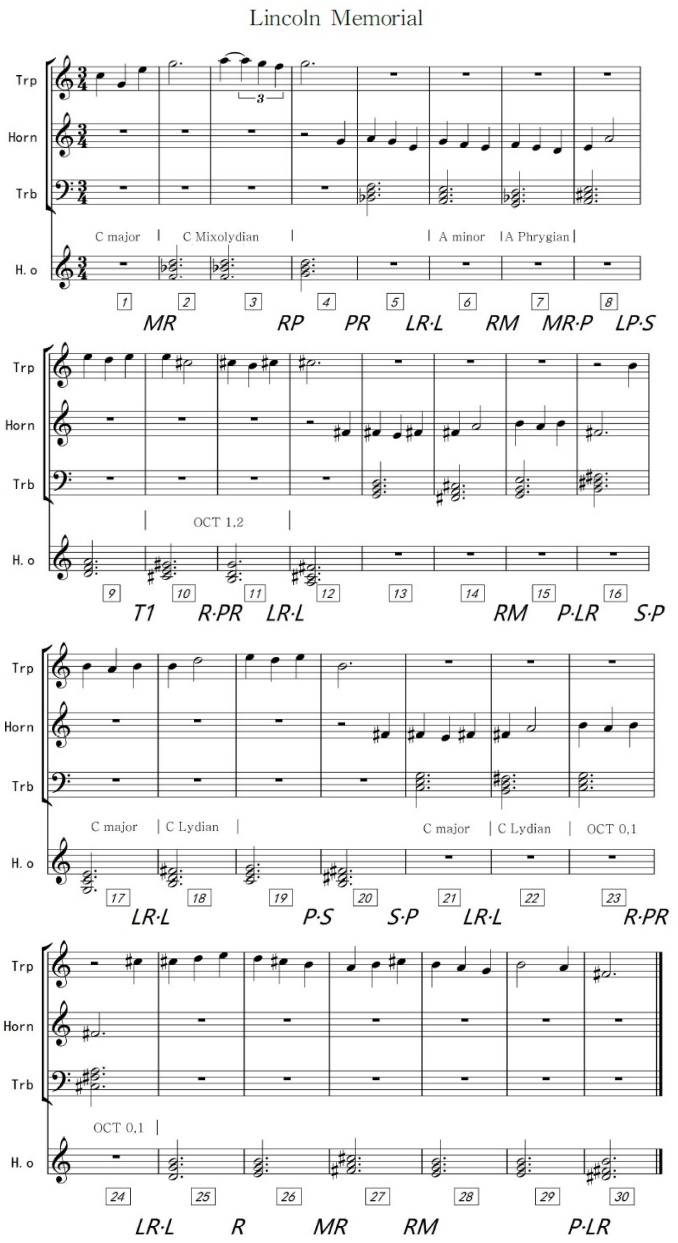

Figure 4. Bernard Herrmann, 'Lincoln Memorial', *The Day the Earth Stood Still*: harmonic reduction

Table 3. Bernard Herrmann, 'Lincoln Memorial', *The Day the Earth Stood Still*: chord

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Chord	C	B♭	B♭	G	B♭	Am	Gm	A	Dm	C♯m
Measure	11	12	13	14	15	16	17	18	19	20
Chord	G	F♯m	G	F♯m	Em	B	C	Bm	C	B
Measure	21	22	23	24	25	26	27	28	29	30
Chord	C	Bm	C	F♯m	G	Em	F♯m	Em	Em	B

The instrumentation of this music consists of trumpet, trombone, organ and French horn. The trumpet and French horn alternate playing the melody, while the trombone and organ alternate the chord progression. From the transformational network in Figure 5 and the transformational graph in Figure 6, it can be analyzed that the most frequent transformations are MR, RM, LR·L, R·PR.

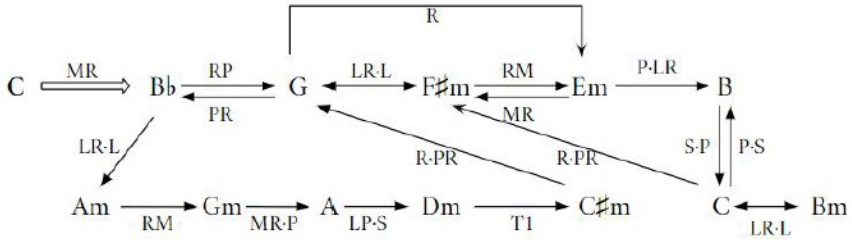

Figure 5. Bernard Herrmann, 'Lincoln Memorial', *The Day the Earth Stood Still*: network

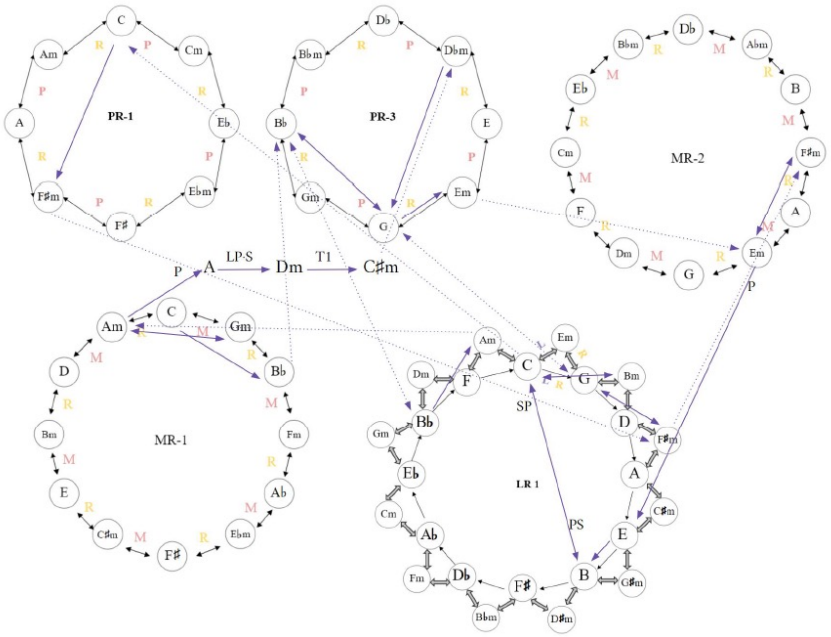

Figure 6. Bernard Herrmann, 'Lincoln Memorial', *The Day the Earth Stood Still*: graph

From these transformations, it can be analyzed that this music uses a large number of borrowed chords in Table 4, and R·PR transformations use octatonic scales in Table 5 to construct chord progressions. The use of modal and octatonic scales matches the atmosphere of neutrality and hesitation expressed in the music with the sentimental and confused atmosphere expressed in the film.

Table 4. Bernard Herrmann, 'Lincoln Memorial', *The Day the Earth Stood Still*: borrowed chord

Chord	C - B♭	Am - Gm	C - Bm
Transformation	MR	RM	LR·L
Borrowed chord	C major - C Mixolydian	A minor - A Phrygian	C major - C Lydian

Table 5. Bernard Herrmann, 'Lincoln Memorial', *The Day the Earth Stood Still*: octatonic scale

Chord	C♯m - G	C - F♯m
Transformation	R·PR	R·PR
Octatonic scale	OCT 1,2	OCT 0,1

Analysis of Gort's Rage

The film content shows the robot Gort discovering Helen, angrily walking towards her and trapping her in a corner. Helen is terrified, paralyzed with fear, screams and falls to the ground with Gort's shadow looming over her. In the film, the scene is an atmosphere of tension and horror, and the sound effects of the low range of the instruments constantly promote the tension and oppression of the music. Finally, the melody lines of non-diatonic also give the music unpredictable dramatic.

Score and chord symbols arranged using reduction are shown in Figure 7 below, and chord progression is shown in Table 6 below

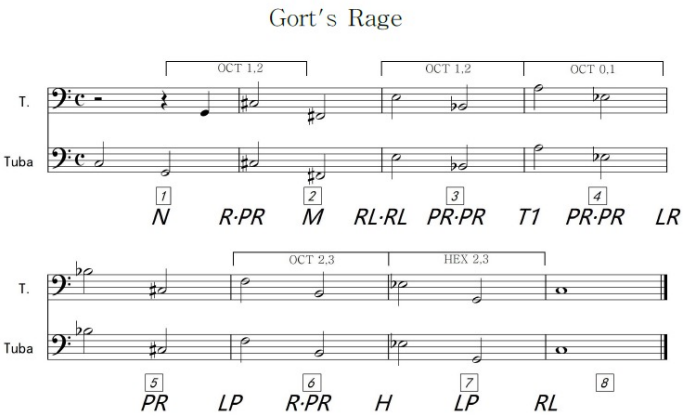

Figure 7. Bernard Herrmann, 'Gort's Rage', *The Day the Earth Stood Still*: harmonic reduction

Table 6. Bernard Herrmann, 'Gort's Rage', *The Day the Earth Stood Still*: chord

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Chord	Cm G	C♯m F	E B♭	A E♭	B♭ C♯	F Bm	B♭ G	C

The main instruments of the music are theremin and tuba. From the score, it can be seen that these two instruments play the same melody in the low register, creating a depressing and terrifying atmosphere through the homophonic texture with low pitch.

From the transformational network in Figure 8 and the transformational graph in Figure 9, it can be summarized that the most used transformations are LP, PR·PR, R·PR.

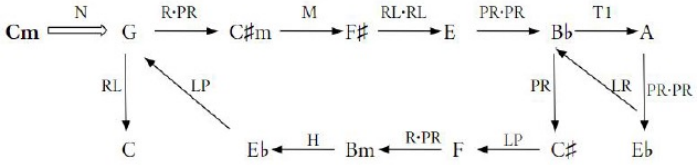

Figure 8. Bernard Herrmann, 'Gort's Rage', *The Day the Earth Stood Still*: harmonic network

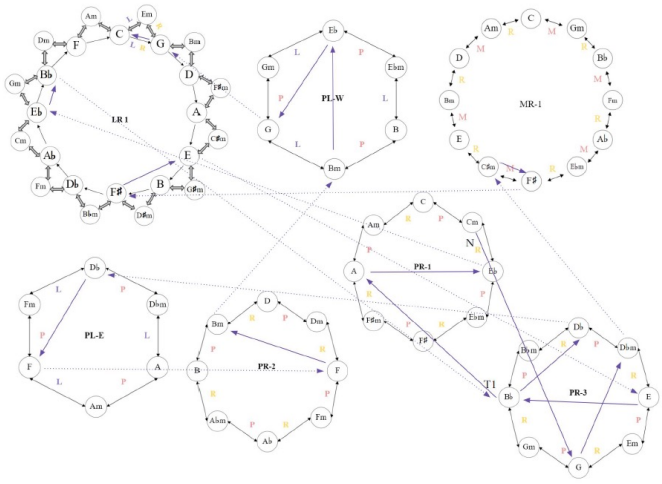

Figure 9. Bernard Herrmann, 'Gort's Rage', *The Day the Earth Stood Still*: graph

Table 7. Bernard Herrmann, 'Gort's Rage', *The Day the Earth Stood Still*: scales

Chord	G - C♯m	F - Bm	E - B♭	A - E♭	E♭ - G	C♯ - F
Transformation	R·PR		PR·PR		LP	
Scales	OCT 1,2	OCT 2,3	OCT 1,2	OCT 0,1	HEX 2,3	HEX 0,1

The main instruments of the music are theremin and tuba. From the score, it can be seen that these two instruments play the same melody in the low register, creating a depressing and terrifying atmosphere through the homophonic texture with low pitch.

From the transformational network in Figure 8 and the transformational graph in Figure 9, it can be summarized that the most used transformations are LP, PR·PR, R·PR.

Results

The results of analyzing the film music analyzed above can be summarized as follows.

- Firstly, music elements that cannot be reasonably explained using the tonal function analysis method can be reasonably explained through the neo Riemannian theory.
- Secondly, the use of church modes, hexatonic scales, and octatonic scales in film music can be verified through neo-Riemannian theory. The use of these scales forms important color elements in specific musical styles.
- Thirdly, chord progression can be intuitively expressed through transformational network and graph. The use of these harmonies is adapted to film music based on thriller, horror, mystery, and science fiction themes.

Conclusions

Through analyzing this work, it is summarized how Bernard Herrmann constructed his unique musical system for thriller, horror, mystery and science fiction films, and how neo-Riemannian theory provides theoretical explanations for the chord progressions in the music. The summarized contents are arranged as follows:

- Firstly, instrumentation. The development of 20th century electronic

music and electronic instruments provided inspiration for timbres in Bernard Herrmann's music for science fiction films. The film not only uses the timbre of the theremin as a sign of extraterrestrial elements, but also uses electric strings instead of traditional acoustic strings. His compositional technique combining electronic instruments and orchestra influenced contemporary film score composition for thrillers, horrors, mysteries and science fictions.

- Secondly, scale construction. The music uses church modes such as MR (C major - C Mixolydian), RM (A minor - A Phrygian), LR·L (C major - C Lydian) and transformations like LP (HEX 0,1), (HEX 2,3), R·PR (OCT 0,1) (OCT 1,2) (OCT 2,3), RP (OCT 0,1) (OCT 1,2), PR·PR (OCT 0,1) (OCT 1,2) containing hexatonic and octatonic scales to form scales with ambiguous characteristics. The use of these scales also forms important color elements in music of specific styles.

- Thirdly, in terms of harmonic structure, there is a significant presence of chromatic harmony progression in the music. These progressions cannot be adequately analyzed using traditional tonal functions. Utilizing neo-Riemannian theory for analysis can conclude that the most frequently used transformations in the film include PR, RP, R·PR, PR·P, PR·PR, RP·RP, PL, LP, RM, MR, LR, RL, LR·L, LR·LR, RL·RL. The representation through transformational networks and graphs is also intuitive.

Recommendations

First and foremost, it is hoped that through this study, the neo-Riemannian theory will be used as an analytical tool to analyze different styles of film music and summarize the characteristics of musical elements such as scales and harmonies in different styles of film music. Second, on the basis of analysis and summary, using neo-Riemannian theory as a creative tool to develop extensions and create new forms of music, while following neo-Riemannian theory, reasonable theoretical analysis can be made.

Limitations of Study

This study uses Western music analysis theory, so it may not be fully applicable to analyzing the characteristics of Oriental film music.

The film music compositions analyzed in this study are from the mid-20th century, and as a result, they may not fully represent the characteristics of contemporary music works within the same genre.

This study primarily focuses on compositions centered around triads, which means that the analysis might not encompass a comprehensive range of chord types.

The analytical conclusions of this study may apply to specific works within the analyzed subjects, and therefore, they might not possess universal representativeness.

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