

ガデンツの構造分析に関する考察

三 上 次 郎

A study on the structure of cadences

Jiro Mikami

Introduction

For those who teach harmony, the difference between harmonic theory and practical pieces is always a difficult subject. If the students acquired a large quantity of knowledge of harmony, that is not possible to be mastered in a short term, they could study the music from various points and interpret it more deeply. But even if the students acquire harmony technique completely, it is not sure that they can interpret the harmonic meaning of even “Sonatine” music on harmonic theory.

Especially in Japan, harmonic comprehension tends to be proven by the knowledge of chord symbolizing. It is because a kind of Japanese harmonic system made a great progress developing the symbolizing technique. The students always need to prove their progression by four-parts writing or symbolizing. The actual pieces, however, cannot always be symbolized by harmonic theory, and when we see the study of *Tristan*, it becomes clear that harmonic theory cannot have an unequivocal answer for the part of that piece, which cannot be analyzed by symbolizing. Besides *Tristan*, in the following piece of classical music, it is hard to say that harmonic analysis is sufficient (Ex.1). In Romantic music, we face more situations like that (Ex. 2).

Ex.1: Kuhlau Sonatine Op.20-2 2mov.



Ex.2: Liszt Sonata h mall

In this treatise, I would grope for the capability of harmonic analysis in a broader range, while observing the harmonic framework on the basis of cadential structure.

Definition of a cadence

Despite various opinions, we can see the types of cadence as follows:

- Authentic cadence
- Deceptive cadence
- Half cadence
- Phrygian half cadence
- Plagal cadence

This treatise mainly focuses on authentic cadence. Needless to say, the authentic cadence is the progression from V to I, but two conditions must be fulfilled, i.e. both cords must be in the root position and the highest voice on the cord of I must be tonic. It does not include inversions like V^6-I or V^4-I . Some, however, treat these progressions as an imperfect authentic cadence. For example, we can see it in *The Elements of Music* written by Ralph Turek.¹ It can be said that authentic cadence consists of the progression of V to I even if it is in the root position or inverted, and of all cadences only authentic cadence always includes the progression of V to I.

The example based on these two conditions is as follows (Ex.3).

Ex.3: Mozart Sonate Kv.283 1 mov.



This cadence fulfills the two conditions; both of that cord must be in the root position and the highest voice is tonic note. On the other hand, there is another case which gives us satisfaction without a soprano's tonic note (Ex.4).

Ex.4: Beethoven Sonata Op.57 3 mov.

Furthermore there is another case that dose not use the root position even in a place that makes a big change in the form (Ex.5).

Ex.5: Beethoven Sonata Op.2-1 1 mov.

1 The Elements of Music Vol.1 148.

As we saw above, it is insufficient to observe only perfect authentic cadence. We have to grasp the structure of Dominant- Tonic while checking the musical form.

Structure of cadence

Before observing harmony, the issue of how to grasp cord progression as a structure of cadence should be mentioned because this treatise aims to observe harmony based on it.

The next piece written by Bach includes five cadences (Ex.6).

Ex.6: Bach Invention No.3

The musical score for Bach's Invention No. 3 is presented in two systems. The first system covers measures 22 to 27, and the second system covers measures 32 to 35. Five specific cadences are highlighted with circled numbers: 1 (measures 22-23), 2 (measures 24-25), 3 (measures 26-27), 4 (measures 32-33), and 5 (measures 34-35). The key signature is one sharp (F#), and the time signature is 3/4.

All thirty pieces of Invention and Sinfonia have this formation, and the form of Bach's fuga is not different from this cadential structure. We can clearly discern that these five cadences have different keys since a progression from dominant to tonic like this has a strong effect on the establishment of key. The movement from dominant to tonic even including inversion, has not a little influence on the key, and this situation becomes an important point when we observe the structure of harmony based on a cadential structure. Except for the closing, four cadences play a role as an ending and a beginning of the phrase and the progression of cords makes a sequence here. We can see the framework of the harmony springing from the cadential structure.

Observation of harmonic framework based on the cadential structure.

From the matters mentioned above, we can define the harmonic framework on the authentic cadence (Ex.7) or on the fracture of the phrase (Ex.8).

Ex.7: Mozart Sonata K.310 2mov.

The musical score for Mozart's Sonata K. 310, 2nd movement, is shown in two systems. The first system covers measures 40 to 41, and the second system covers measures 42 to 43. A cadence structure is highlighted with a circled number 1 (measures 40-41). The key signature is no sharps or flats, and the time signature is 4/4.

Ex.8: Idem



We can see four cadences in Bach's "allemande" of French Suite No. 5. We can decide the position of these cadences not only by the progression of dominant-tonic but also by the formation. Although there is the authentic cadence in the 8th measure as a closing of this segment, we can see the same cadence of dominant-tonic in the 5th and 6th measures. We cannot feel perfect closure in these two progressions even though these are authentic cadence, since there is no change of the form in these places. On the other hand, we can feel the sense of full closing in the 8th measure because there is a big change of form. The whole of this piece can be schematized as follows (Fig.1), and the cords of each segment can be simplified like the following (Fig. 2).

Fig.1

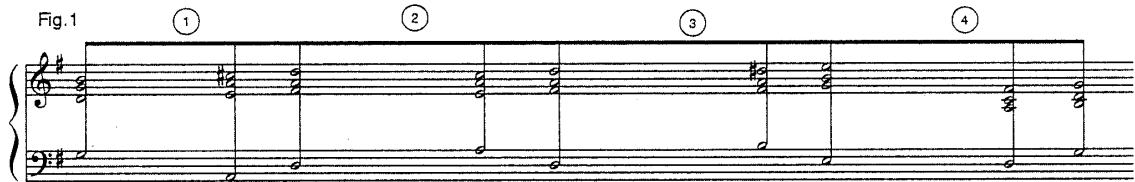


Fig.2



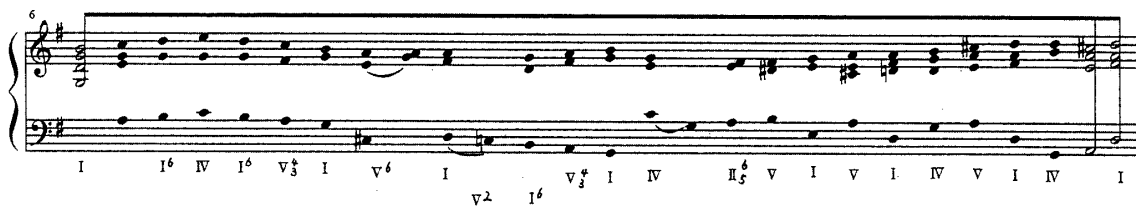


In the next stage, I will try to analyze the harmonic structure of these four segments.

The analysis of the harmonic structure in the segments.

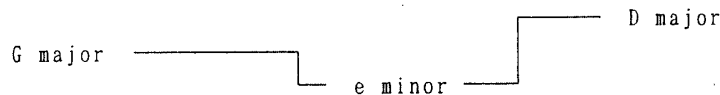
The first segment can be symbolized as follows (Fig.3).

Fig.3



We can see that this segment has a inclination to the dominant key, because the beginning is in G-major and the ending is in D-major. This segment is mostly in the dominant-tonic movement including inversion. This progression accounts for 60% of the total. We can see the slight difference of the keys in this segment from G-major to the dominant key because all the progression of dominant to tonic is not necessarily tonic key G-major, but this kind of progression has much influence on the establishment of the keys. The difference of the keys can be found in the next figure (Fig.4).

Fig.4



There is a slight difference here because e-minor is the relative key of G-major and the relationship of these keys is very close, and then this music moves to D-major, which is the dominant key of G-major. The relative key and dominant key take the position of neighbors of the tonic key in the next figure (Fig.5). Figure 5 disposes and connects all the keys, placing the dominant keys above, subdominant keys below, relative keys to the left, parallel keys to the right. This figure clarifies the relationship among the keys. In this figure, each box is connected to the others by bars. It means that the more bars there are separating 2 keys, the more distant the

relationship becomes. It is obvious that the relative key and dominant key are the same distance from the tonic key. But relative key is closer than dominant key because the former has the same key signature and the latter a different key signature, adding one more sharp.

From this point of view, we can see the whole key relationship of this segment below (Fig.6). There seem to be no different opinions that this dominant-
tonic progression occupies most of the place in this segment. And the fact that this progression has a big influence on the decision of the key, makes it possible to observe the whole movement of the key on the basis of this progression. The dominant cord, especially, fortifies its effect by adding the seventh tone.

Fig.6



Fig.5

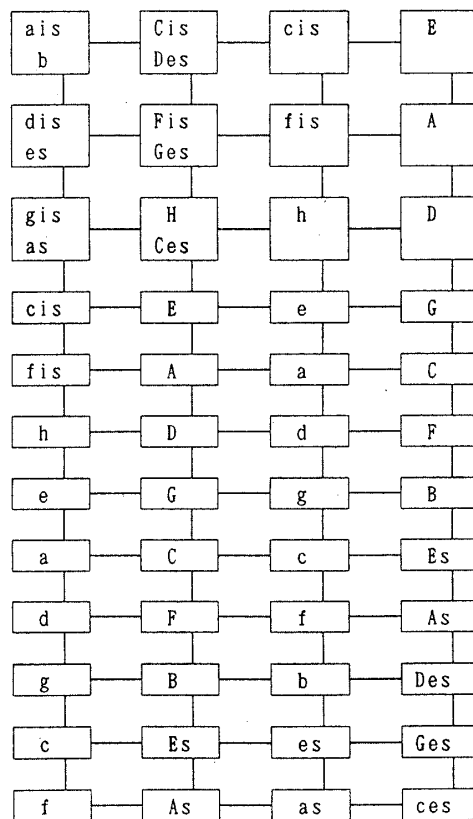
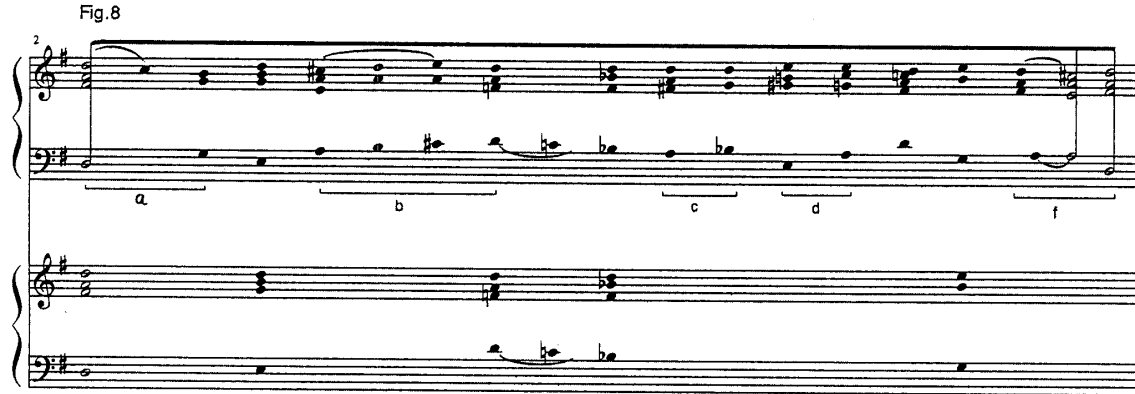


Figure7 indicates progression of the rest after reducing the dominant-tonic movement from the whole harmonic structure. It shows the progression of dominant-tonic in the upper tier indicated by the sign \lrcorner , and the lower tier shows the rest caused by deducting the progression of dominant-tonic. ① is the plagal cadence and has a perfect closing in spite of including the passing-cord. In the other two, we cannot see the progression without adding the cords before and after. ② gives us the felling of the impingement moving to the relative key while making the subdominant cord caused by descending the fifth tone of the IV cord by half a step. ③ is the subdominant cord in the cadential structure of T-S-D-T. These three progressions are rather basic ones and do not entail the difficulty in analyzing the harmonic structure.

Fig.7

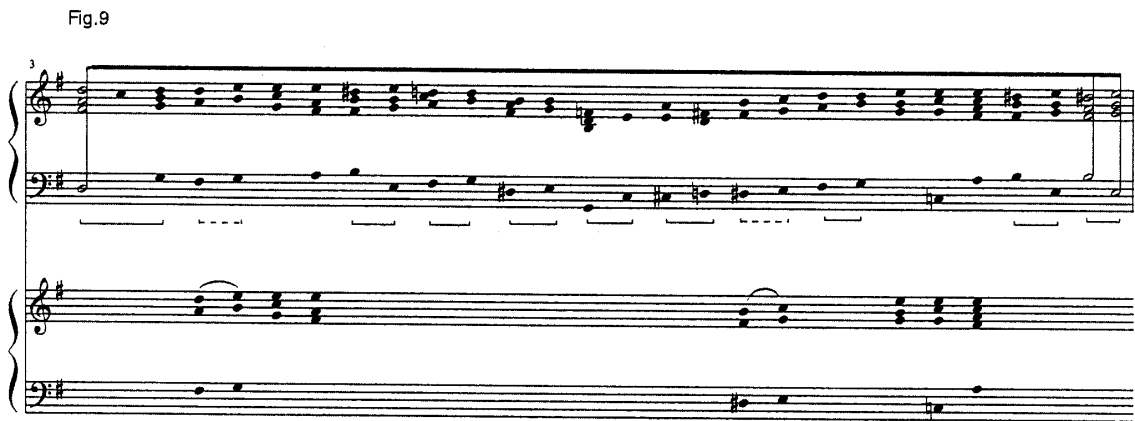


The second to fourth segments are schematized as follows (Fig.8-9). Although most of the second segment is constructed by the progression of dominant to tonic, it is more complicated than the first one. We can observe each progression as follows.



- a: Normal progression of dominant to tonic; G-major.
- b: Including prolongation in the dominant and having the propensity for a gray area between the D-major and the d-minor.
- c: The progression of dominant to tonic including the inverted cord.
- d, e: The progression of passing dominant.
- f: The fundamental progression of dominant to tonic and perfect closing.

The third segment in Fig.9 is a repetition of the first one.²



² Strictly speaking, this is not a mere repetition. This form is derived from the dancing music, which was composed in this era, but I do not refer to the formation here because it would deviate from this subject.

The two parentheses in the Fig.9 above have the same meaning. This treatise focuses on the authentic cadence, but the progression of dominant to tonic has one more cadence named deceptive.

This cadence uses the VI cord instead of the I in the tonic position like this (Ex.9).

The deceptive cadence usually uses the root Position, but in these two progressions the first inversion is used in the dominant position. The deceptive cadence is used as a substitution for the authentic cadence like the following (Ex.10).



Ex.10: Beethoven Sonata Op.10-3 4mov.



But in these cases, it is rather a gathered passing-note than a closing, because these two progressions include the first inversion. Especially this tendency is more noticeable in the second one than the first one (Fig.10). The dominant-tonic progressions in the third segment are in the range of the relative, subdominant, and dominant keys. Figure 11 is the last segment. Most of this segment consists of the progression of dominant-tonic. We feel the width of the key because it includes a parallel minor of the tonic key and that of the subdominant key.

Fig.10

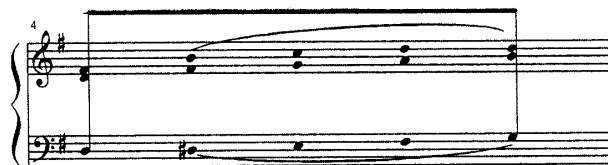


Fig.11



It is hard to say what the standard is, but we will make more statements about this case, while referring to next article “harmony” in The New Grove Dictionary of Music,

The meaning of any sequence of chords must depend on where, formally, it occurs.

[. . .] the astonishing harmony at the beginning of Beethoven’s Waldstein Sonata op.53, for example, would be out of place at the end of a movement: its effect as a beginning is compelling and forward-driving.

It is not certain what “the astonishing harmony” means in this article, but we can suppose it is the harmony from the beginning to the 13th measure of this piece because it mentions “at the beginning”. Despite the principle that the keys are established on the fourth up root progression, i.e, dominant-tonic progression, this piece moves to another key before establishing even tonic key (Ex.11).

Ex.11: Beethoven Waldstein Sonata op.53 1 mov.



We can suppose that the harmonic movement is bigger at the beginning of the piece than the ending, since this sentence says that would be “out of place at the end of a movement”. In fact, there are many pieces like that. Thinking from this criterion, this piece by Bach, however, cannot be explained by the normal concept of harmony, because it has a big change at the ending of the piece. The question of creativity still remained to be unsolved even if we could explain the harmonic structure of this piece. We can find a clue to the interpretation through the analysis of the harmonic structure like this.

The actual analysis.

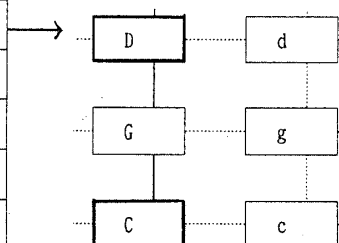
We have observed the method of analysis based on the cadence structure in four ways:
 to divide the whole piece into some segments taking the structure of cadence and formation into consideration,
 to reduce the progression of dominant to tonic from the segment,
 to compare the key of the dominant-tonic progression with the key which dominates the segment,
 to observe the harmonic structure of the rest after reducing the dominant-tonic progression.
 In these ways we can see what kind of harmonic structure will appear.

Mozart Piano sonata K.283 1 movement.

This piece can be divided into 14 segments. The result of the analysis of each segment is as follows (Fig.12).

Fig.12

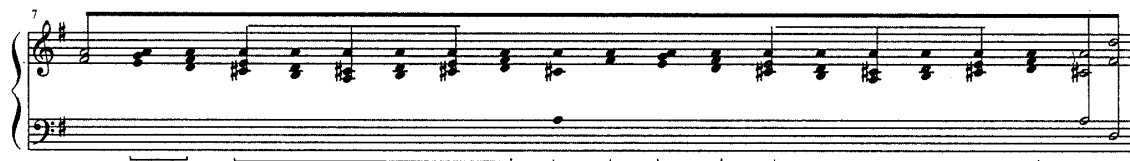
seg. No.	Beg. key	Key of D-T progression	End. key	dist	per.
1	G	G: G: G: G:	G	0	67
2	G	G: G: G:	G	0	64
3	C	C: G: G: D:	G	2	73
4	D	D: D: D: D: D: D:	D	0	83
5	D	D: D: A: G: D: G: D: D:	D	1	89
6	D	D: D: D: D: G: D: G: D:	D	1	91
7	D	D: D: D: D: G:	D	1	71
8	G	G: a: a: C:	C	2	73
9	C	C: G: G: D:	D	2	80
10	G	G: G: G: G: G: G:	G	0	92
11	G	G: G: D: C: D: C: G: G:	G	1	89
12	G	D: C: D: C: G: G:	G	1	87
13	G	G: G: G: G:	G	0	86
14	G	G: G: C: G: C: G:	G	1	84



Seg.No.=Segment number: Beg.key = Beginning key : End.key = Ending key
 Dist. = distance between beginning key and key of D-T progression:
 Per.= percent

We can see in the chart that the farthest relation of the keys has two bars. We cannot see the conspicuous character of the harmonic structure after reducing the dominant-tonic progression because most of this piece consists of the dominant-tonic progression. All these harmonic progressions are constructed in a narrow range of keys, but there is a noteworthy progression in the fourth segment of measures 23-30 and sixth segment of 43-53 measures. We can see the prolonged dominant in the fourth segment (Fig.13).

Fig.13



These cords marked by an asterisk are, what is called, passing-cords. These three cords cannot be considered as independent cords, but considered as one cord. There is the same passing cord in the next sixth segment (Fig.14).

Fig.14



It cannot be analyzed as an independent cord; instead the progression of dominant-tonic indicated by dotted arrows is the main framework. These two harmonic structures can be seen in the ninth and fourteenth segments of the recapitulation.

Beethoven Piano sonata op.2-1 1 movement.

This piece can be divided into 16 segments. The indication of this, as with Mozart's piece, is as follows (Fig.15).

Fig.15

seg. No.	Beg. key	Key of D-T progression	End. key	dist	per.
1	f	f: f:	f	0	50
2	c	As: Es: As: Es: As: Es: As: As: As:	As	1	73
3	As	As: Es: Es: As: As: As: As:	As	0	93
4	As	As: As:	As	0	67
5	As	As: As: As:	As	0	71
6	As		b	2	0
7	b	b: b: b: b: c: c:	c	2	89
8	c	c: b: As: f: f:	f	2	67
9	f	f: f: f: f: f:	f	0	67
10	f	f: f:	f	0	67
11	f	f: f: f:	f	0	57
12	f	b: c: f:	f	1	75
13	f	f: f: f:	f	0	50
14	f	f: f: f: f: f:	f	0	100
15	f	f: f:	f	0	66
16	f	f: f: f: b: As: f: f:	f	1	66

We can see some noteworthy characteristics in this piece. The first segment ends in the cord of V and it is normal structure (Fig.16). This last V cord, however, does not move to the tonic cord as a dominant cord, instead it is connected to the I cord of the c-minor. Although the distance

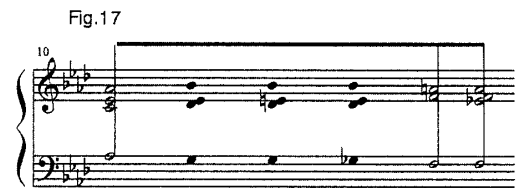
Fig.16



between f-minor and c-minor is not so far because c-minor is the dominant key of f-minor, it is a rare connection since the minor key usually moves to the relative major key in the sonata form.

There is no dominant-tonic progression in the sixth segment (Fig17).

The first theme, which is beginning of the development, is harmonized variably in this place. This segment consists of a harmonic structure in which the tonic cord of the A \flat major moves to the dominant cord of the B \flat minor, and the altered cord appears just before the dominant cord of B \flat minor. I think that the process to the altered cord needs to be considered more. In this segment, the second dominant-seventh cord of A \flat major reaches to the altered cord through the diminished seventh without resolution. The dominant-seventh cord, which does not resolve like this, became more useful in the Romantic era. In this case, the sound of the dominant-seventh cord has both functions of dominant and subdominant (Ex.12).³



Ex.12: Beethoven Sonata Op.109 1 mov.



In the tenth segment there is the cord which is hard to be explain by the theory of harmony. “The Neapolitan cord constructed on the dominant tone” is the limit of explanation based on harmonic theory (Fig.18).

We can understand this effect when we think of this dominant tone as a suspension. The next example is even harder to explain by harmonic theory (Ex.13). We can comprehend this cord on the tonal effect in the current of the music, but it is hard to explain the structure by harmonic theory.



Ex.13: Brahms capriccio fis-moll Op.76



3 This theory is valid on the proposition that the doppel-dominant comes under the category of subdominant. Which category, dominant or subdominant, the doppel-dominant comes under needs further discussion, but in the most cases music students think the doppel-dominant is under the category of subdominant, since they had been taught that the function of doppel-dominant is subdominant in Japan.

Further study of this piece should be done on another occasion.

One of the structural characters of this music by Beethoven is, there are many applied cords including the doppel-dominant. There is the prolonged doppel-dominant in the twelfth segment and we can see the doppel-dominant which is an altered cord including $D\flat$ in the fourteenth segment.

Here we will take each one of the segments from three pieces. First, Figure19 is a segment of 22~52 measures of Piano Sonata D.959 written by Schubert.

Fig.19



The dominant-tonic progression is indicated by the sign ┌───┐ , the same way as before. And the dotted parenthesis means prolongation of one cord. The key dominating this segment is A-E major, and the $A\flat$ -major key of the dominant-tonic progression is the furthest from this A-E major. This distance equates to six bars of Fig.5, and we can find that this piece has a more intensive modulation in comparison with the two above classical pieces.

The following is the segment of 63-77 measures of the Grand polonaise op.22 composed by Chopin (Fig.20).

Fig.20



Although the total flow of this segment is dominated by the $E\flat$ major, it has the dominant-tonic progression in the E major in the later part, consequently the distance of the key becomes 6 bars. In this segment, the dominant seventh cord is prolonged by inserting the passing cords as indicated by the sign ┌───┐ . This dominant-tonic progression does not establish the key so

strongly because this is a part of the passing cords, and has a difference meaning from Schubert's piece above even in the same distance. We should need more arguments on this subject.

The third one is the segment of Piano sonata written by Liszt. As we can see in Figure21, the segment is dominated by E ♭ minor as a whole, and the dominant-tonic progression is indicated by .

Fig.21

These dominants are constructed by VII7 cord, and do not establish the key as firmly as the usual dominant-tonic progression because they are diminished cords. Even in this condition, the second dominant-tonic progression is A-minor and the distance between this key and E ♭ -minor becomes five bars. From these observations, we can see that the pieces from the Romantic era have more distance of the key than those of the Classic era, and we can prove this by considering the progression of dominant-tonic on the basis of cadence structure.

Conclusion

The progression of dominant-tonic has not changed so intensively through each era. Composers had been required to change the musical style with the tide of history by embellishing this progression. As observed in this treatise, the relationship between the main key and the key of the dominant-tonic progression obviously changed historically. The difference of tension created by distance makes an influence on the formation too. We have observed the method of grasping the character of harmony, while comparing the dominant-tonic progression with the segment divided by the cadence. I would like to continue my observation on other pieces with this method.

Bibliography

- Aldwell, Edward and Carl Schachter. *Harmony and Voice Leading*
New York: Harcourt Brace Jovanovich 1978-79.
- Casella, Alfredo. *The Evolution of Music Throughout the History of the Perfect Cadence*.
London: J.&W. Chester, Ltd., 2nd edition, 1964.

- Salzer, Felix. *Structural Hearing: Tonal Coherence in Music*.
New York: Dover Publications 1962.
- Schenker, Heinrich. *Harmony*
Edited and annotated by Oswald Jonas. Trans. Elisabeth
Mann Borgese. Chicago: University of Chicago Press, 1954.
- Schoenberg, Arnold. *Structural Functions of Harmony*
Revised edition, with corrections, edited by Leonard Stein
New York: W.W. Norton, 1969.
- Turek, Palph. *The Elements of Music*
New York: McGraw-Hill, Inc. 1988.
- Ward, William R. *Examples for the study of MUSICAL STYLE*
Wm. C. Brown Company Publishers 1970.
- The New Grove Dictionary of Music & Musicians, Ed. Stanley Sadie.
- 島岡 讓 他 『「和声」理論と実習』 I～III巻 音楽之友社 昭和39年