

Chromatic modulation ($\circ 7$, $+6$, N^6 chords as pivot chords)

The fully-diminished seventh chord, the augmented sixth chord (most especially the $Gr+6$), and the Neapolitan sixth chord may all be used as pivot chords in modulations. This handout describes the process for all three; the $\circ 7$ chord is by far the most complicated.

I. The $\circ 7$ as a pivot chord

This portion of the handout is divided into five basic sections: 1) a brief introduction showing the versatility of the $\circ 7$ as a pivot chord; 2) an explanation of how, given a single $\circ 7$ chord, one may modulate to just about any other key; 3) a discussion of how to find a $\circ 7$ pivot chord when given two keys; 4) modulation in a slightly different vein: a $\circ 7$ (or some inversion) turning into a $Mm7$ (or some inversion); and 5) analysis hints.

A. Brief introduction: the versatility of the $\circ 7$ chord

Consider the following chords:

$\circ 7$ $\circ 6_5$ $\circ 4_3$ $\circ 4_2$

While they may *look* different, and are *written* as different inversions of a $\circ 7$ chord, **THEY SOUND ABSOLUTELY IDENTICAL**. These chords are thus said to be **enharmonically equivalent**.

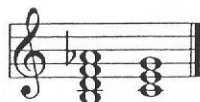
This means that when you **hear** this chord, you can't be absolutely sure of what inversion the chord is in, nor what the root of the chord really is (**note**: some theorists say that $\circ 7$ chords don't really have "roots." They're really right, but for the purposes of this discussion, we'll make use of the term). Composers — *especially* those of the late 18th and 19th centuries, *especially* in developmental sections of music — take advantage of this ambiguity and use the $\circ 7$ chord as a pivot chord for modulation.

This may all appear to be an intellectual conceit, but it's really not — it *can* and *should* affect performance. If you realize that the $\circ 7$ is a "slippery," ambiguous chord, then you realize that those moments when they are emphasized are moments of musical (and perceptual) ambiguity. The intelligent performer may then elect to "play with" the moments of ambiguity, perhaps giving them just a bit more time or rubato in order to allow the ambiguity to have its fullest effect.

B. Given a single $\circ 7$ chord, one may modulate to just about any other key

Think for a moment of the chord shown above: $B D F A^b$ and its enharmonic equivalents. If B functions as the root, it may resolve to some sort of C chord — either C Major or C minor. If G^\sharp functions as the root, it may resolve to some sort of A chord — either A Major or A minor. If F functions as the root, it may resolve to some sort of G^b chord — either G^b Major or G^b minor. If D functions as the root, it may resolve to some sort of E^b chord — either E^b Major or E^b minor.

Make any sense so far? Reread the previous paragraph until you understand it. Now here's the yet more tricky part: those hypothetical chords of resolution — C Major, A Minor, or whatever — don't necessarily have to be a tonic chord in a key. For example, see the two chords shown on the next page:



These chords could function as $vii^{\circ}7$ — I in C Major, $^{\circ}7/IV$ — IV in G Major, $^{\circ}7/V$ — V in F Major or F minor, $^{\circ}7/III$ — III in A Minor, $^{\circ}7/VI$ — VI in E Minor, and so on. When you add the fact that the $B^{\circ}7$ chord may really sound in any inversion (B may not actually be the root), you easily can see that the possibilities are virtually infinite.

Here's what we'll work on next: given a $^{\circ}7$ chord of some kind, how could it function in a particular key? There are basically five steps involved:

1. Imagine that each note of the $^{\circ}7$ chord may be a root, and think of the pitches that it may resolve to (be sure to include enharmonic equivalents).
2. Ask yourself: which of those pitches of resolution are diatonic in the key you're thinking of? For our purposes, think of natural minor — that is, think of the lowered $\hat{6}$ (*le*) just a half-step above $\hat{5}$, and think of the subtonic — *te*, or “natural” $\hat{7}$ as found in the key signature.
3. Eliminate those pitches which are $\hat{7}$ in a major key, or if your “target key” is minor, eliminate $\hat{2}$. The reason: as you already know, there is no such thing as $^{\circ}7/vii^{\circ}$ nor $^{\circ}7/ii^{\circ}$ in a minor key.
4. Once you figure out the pitch or pitches left, think of the enharmonic spelling of the $^{\circ}7$ chord needed so that the $^{\circ}7$ will resolve to that pitch.
5. Make sure that you figure out the correct inversion.

As an example, let's use the $^{\circ}7$ chord spelled $F^{\#} A C E^{\flat}$ and the key of D Major.

- Step 1:** $F^{\#}$ would resolve to G. A would resolve to B^{\flat} (or enharmonically to $A^{\#}$). C would resolve to D^{\flat} (or enharmonically to $C^{\#}$). Finally, E^{\flat} would resolve to F^{\flat} (or enharmonically to E).
- Step 2:** The resolution pitches G, $C^{\#}$, and E are diatonic in D Major.
- Step 3:** Eliminate $C^{\#}$ because it's $\hat{7}$ in D Major.
- Step 4:** The chord would thus resolve either to G or to E. To resolve to G, the root needs to be $F^{\#}$ and the spelling would thus be $F^{\#} A C^{\natural} E^{\flat}$. To resolve to E, the root needs to be $D^{\#}$ and the spelling would thus be $D^{\#} F^{\#} A C^{\natural}$. The C-naturals are included to make the spelling completely correct — they negate the C-sharp of the key signature.
- Step 5:** Since the “given” chord is $F^{\#} A C E^{\flat}$, this would simply function as $^{\circ}7/IV$. If you think of the spelling where $D^{\#}$ is the root, however, then $F^{\#}$ (the “given” root) is really the *third* of the chord $D^{\#} F^{\#} A C$. The proper inversionsal label of the enharmonically respelled chord is $^{\circ}6_3/ii$.



C. Given two keys, how can I find $^{\circ}7$ pivot chord(s)?

Compared to what you just did, this is pretty easy. Well, there's really the easy but incomplete method and also the tougher but more comprehensive method. Let's do both, using the somewhat unlikely keys of C Major and $F^{\#}$ minor.

1: the easy/incomplete method. For this, all you do is write out the pitches of both scales (use natural minor for minor keys) and find the notes which they have in common. Eliminate $\hat{7}$ in a major key and $\hat{2}$ in



a minor key. For CM and $f^\sharp m$, the pitches in common are A, B, D, and E. Eliminate the pitch B since it's $\hat{7}$ in C Major, and you'll see that A, D, and E still "work." This means that $^\circ 7$ of A, D, and E would work as a pivot chord: $^\circ 7/A$ is $/vi$ in CM and $/III$ in $f^\sharp m$, $^\circ 7/D$ is $/ii$ in CM and $/VI$ in $f^\sharp m$, and $^\circ 7/E$ is $/iii$ in CM and $/VII$ in $f^\sharp m$. Notice how the diminished 7th chord may be "of" a major chord in one key and "of" a minor chord in the other — this is fine.

2: the tougher/more comprehensive method. Begin by doing the easy way just illustrated. **Then**, there's a second thing to think about: **any** $^\circ 7$ of **any** pitches that are a $m3$ or a tritone apart will also work. Thus, using CM and $f^\sharp m$, such chords as $vii^\circ 7$ in CM and $vii^\circ 4_3$ in f^\sharp or $^\circ 7/IV$ in CM and $^\circ 6_5/VI$ in f^\sharp would also work. These are only two out of many possibilities, which is why this might be characterized as the "tougher/more comprehensive method."

D. A $^\circ 7$ chord turning into a Mm7 chord

Here's an interesting fact: if you take a $^\circ 7$ chord and lower any **one** of its pitches by a half step, you come out with a Mm7 chord (note the respellings of some of the Mm7 chords):

$^\circ 7$ Mm7 $^\circ 7$ Mm7 (Mm7) $^\circ 7$ Mm7 (Mm7) $^\circ 7$ Mm7 (Mm7)

Nineteenth-century composers (and some earlier ones, too) thought that this was an incredibly cool thing: the music could arrive at $^\circ 7$ in some key, and then by altering just **one** note by **one** half step, the chord could become a dominant seventh (or even a secondary dominant!) in some new key. This could actually work "the other direction," too, but this is more rare — take a Mm7 chord, raise its root by a half step, and it becomes a $^\circ 7$ chord.

E. Analysis hints

What you've read basically covers it, but there are a few more important points to make:

1. This one's **especially important**: if the $^\circ 7$ pivot just occurs once as a single chord (as is usually the case), then it **cannot** be spelled two different ways at once! Therefore, it may be spelled "incorrectly" in one of the two keys. While there are no hard-and-fast rules here, it's more often spelled "correctly" in the **new** key and "incorrectly" in the old one (this makes sense, since the music moves on into the new key, leaving the old one behind).
2. This then becomes a matter of interpretation: the Roman numeral function in one of the keys will usually be clear enough, but it will be less clear in the key where it's spelled "incorrectly." In addition, one cannot rely on spelling alone — one must consider any and all enharmonic possibilities. **So**, one then has to be logical: $^\circ 7$ chords usually function as $vii^\circ x$ in a key, or as something "of" V or perhaps "of" IV. If the two possibilities are, say, $^\circ 4_2/VII$ or $^\circ 6_5/V$, it should be obvious that the chord "of" V makes more musical sense and is more likely.
3. The chords most often involved are probably $vii^\circ x$ and $^\circ x/V$. One additional thing which sometimes happens: composers will occasionally modulate from a major key to its dominant by using $^\circ 7/ii$ in the tonic key, then resolving it surprisingly to a major triad which then becomes V in the new (dominant) key. An example: you're going along in CM, and you encounter a $^\circ 7/ii$ chord, which you'd expect to resolve to a D minor triad. It resolves unexpectedly to a D Major triad, which then becomes V in the key of G Major. Composers often will stick in a I_4^6 in the new key before the V; this is even more of a surprising resolution.

II. The +6 as a pivot chord

In case you haven't noticed yet, the Gr+ chord is enharmonically equivalent to a dominant seventh chord — they *sound* identical, though they're *spelled* differently. **Notice** in the following examples that the respelling involves the **seventh** of the dominant seventh chord versus the **augmented sixth** (the raised 4, or *fi*) of the augmented sixth chord. **Another important thing to know:** the pivot chord typically only occurs once; it thus can't be spelled *both* ways at once. While it could be spelled "correctly" in either the old or the new key, it's probably more often the case that the chord is spelled as it functions in the *new key*, as was mentioned in the discussion of ^o7 chords above. While there are a lot of possibilities, we'll focus on two: the V⁷ becoming a Gr+6 in another key (or the reverse) and V⁷/IV becoming a Gr+6 in another key (or the reverse).

The V⁷ becoming the Gr+6 (or the reverse): in this case, the keys involved will be a minor second apart; the keys may be either major or minor. When the V⁷ becomes the Gr+6 (which happens more often, since pivot chords are often a pre-dominant chord in the new key), the new key is a half step lower:

C: I IV I₄⁶ V I V⁷ = b: Gr+6 i₄⁶ V i

This could just as easily have modulated to B Major — the Gr+6 is identical in either B minor or B Major.

When the Gr+6 becomes the V⁷ (a bit less common than the preceding), the new key will be a half step higher:

C: I IV I₄⁶ V I IV⁶ Gr+6 = Db: V⁷ I IV I₄⁶ V I

The V⁷/IV becoming the Gr+6 (or the reverse): in this case, the keys will be a major third apart. More often than not, the "old" tonic chord has a minor 7th added to it, thus creating a V⁷/IV. The latter then functions enharmonically as a Gr+6 in a new key a M3 higher:

C: I IV I₄⁶ V I V⁷/IV = E: Gr+6 I₄⁶ V I

III. The Neapolitan as a pivot chord

This is the simplest topic in this handout. There are two possibilities: either a **diatonic** chord in the **old** key becomes a **Neapolitan sixth chord** in the **new** key, or the reverse — a **Neapolitan sixth chord** in the **old** key becomes a **diatonic** chord in the **new** key.

A couple of things to think about:

1. Since the N^6 is a major triad in first inversion, then it's likely to be equivalent to I^6 , IV^6 , or V^6 in a **major** key, or III^6 , V^6 , VI^6 in a **minor** key.
2. Since pivot chords often function as pre-dominant chords in the new key, the RN function of the pivot chord in the new key is likely to be N^6 or IV^6 . See the examples below. Note that the second one involves the enharmonic reinterpretation shown, just for fun.

enharmonic
respelling
↓

C: I - ⁶ IV V	I N ⁶	A: I vi IV V	I V ⁶
A ^b : IV ⁶ I ⁶ ₄ V		E ^b : N ⁶ — I ⁶ ₄ V	
I		I	

- Theoretically, it's possible for a secondary dominant of some kind to be involved: for example, the N^6 in the old key could become V^6/V in the new key. Bear in mind that this is possible, but we will not worry extensively about it in this class.

Robert Schumann: "Die Tochter Jephta's," Op. 95 no. 1, mm. 32-45

32 *The triumph came through*
 Held nicht ver-zagt! Der Tri-umph kam durch

36 *me to you (collectively) and my*
 mich euch her-bri, und mein

39 *father the homeland is so free!*
 Va-ter, die Hei-math sind frei!

42 *when the blood that you gave is welling up.*
 Wenn das Blut, das du gabst, ist ent-wallt,

dimin.

Exceptional use of the $\circ 7$, N^6 , and $+6$ chords

Up to this point, we have encountered the most typical, “normal” use of the $\circ 7$, N^6 , and $+6$ chords. Fully-diminished seventh chords may function as $vii^{\circ 7}$ in a key or as secondary diminished seventh chords ($\circ 7/V$ and so on); they may occur in root position or any inversion. The Neapolitan sixth chord most often occurs in first inversion, functioning as a chromatic pre-dominant chord with $\hat{4}$ in the bass and $b\hat{2}$, $\hat{4}$, and $(b)\hat{6}$ in the upper voices. Augmented sixth chords ($It+6$, $Fr+6$, $Gr+6$, and $DA+6$) usually function as chromatic pre-dominant chords with $b\hat{6}$ in the bass and $\hat{1}$ and $\#\hat{4}$ (forming an augmented sixth above $b\hat{6}$) and some other note in the upper voices. You’ve also learned that these chords may be used as pivot chords in modulations.

It’s time now to cover a few “exceptional” or unusual uses of each of these chords. Bear in mind that the “normal” use of these chords is what very frequently occurs, but you need to be aware of these exceptions, too.

The exceptional fully-diminished seventh chord

As you already know, the most normal diminished seventh chord includes a root, which resolves up by a half step, and three other pitches, all of which change (typically moving down by step) upon resolution of the chord. Let’s call this the “normal, functional” diminished seventh chord and its resolution to some major or minor triad. There are (at the very least) **two** types of “exceptional, irregular” diminished seventh chords, both of which provide different functions and resolutions than the “functional” diminished seventh. These are the **common tone** diminished seventh and the **consecutive** diminished seventh.

The **common tone** diminished seventh chord includes a note in common with the chord of resolution; it thus does not resolve in a completely “functional” manner. It is labeled $CT^{\circ 7}$ (makes sense, huh?) See the Mozart example below — the third beat of m. 3 looks like $\circ 4^{\circ 2}/iii$ in G major, but it obviously doesn’t function that way (it resolves to I). Notice that the note G is the common note between the diminished seventh chord and the following one; therefore, the label $CT^{\circ 7}$ is the best one in this situation.

G: I IV⁷ CT^{°7} I

The **consecutive** diminished seventh is even simpler: when one diminished seventh resolves directly to another one, this is an example of consecutive diminished seventh chords. The example below shows a tonic chord then three diminished seventh chords in a row. The first two are labeled $\circ 7$ because they are followed by *another* diminished seventh chord. The final one resolves functionally; therefore, it is given its functional label of $\circ 7/V$.

C: I $\circ 7$ $\circ 7$ $\circ 7/V$ V I

The exceptional Neapolitan chord

Here are a couple additional items of information about the Neapolitan chord:

1. It sometimes may occur in **root position**, in which case it's simply labeled N (or \flat II). This happens more frequently in the 19th century; Chopin was fond of it.
2. The Neapolitan may be **preceded by its own dominant**, which would then be labeled V^7/N . The progressions $V^7/N \rightarrow N$ and $V^7_2/N \rightarrow N^6$ are the most common. The Chopin example given below shows this:

a: V^7/N N V^7 i

3. Given that the Neapolitan may be preceded by its own dominant, it may occur to you that the Neapolitan could even be *tonicized*, and this is the case. Composers sometimes wrote entire **tonal regions** in the Neapolitan; for example, in a piece in C major, entire sections may be in $D\flat$ major (Beethoven and Schubert were especially fond of this special key relationship; note how distant the keys are).

The exceptional augmented sixth chord

Here are a couple additional items of information about augmented sixth chords:

1. The +6 chords may occur in "inversion," though this is pretty rare. Usually, the +6 interval is inverted to be a $\circ 3$; thus scale degree $\flat 6$ would be in some upper voice and $\sharp 4$ would be in the bass. In the example below, you can see one way of labeling this chord. Some argue that it isn't necessary to label the inverted +6 in any special way. Why not? Because the +6 chords don't really have roots — they're more about voice leading. As a result, "inversion" isn't really possible.

A: I I^6 IV Gr+6 I^6_4 V I
(inv.)

2. The +6 chords may occasionally be “of” something other than V. In other words, the tremendous “pull” of an augmented sixth may move to a goal other than V. Some theorists call these “secondary augmented sixth chords,” since they serve to linearly embellish something other than the norm. Often the goal will be the tonic chord, in which case the augmented sixth involved will be the interval from scale degree $\flat\hat{2}$ up to $\hat{7}$ (that’s *ra* up to *ti*).

This type of chord is labeled +6/x, where x is some triad other than V. See the example from Brahms’s *Symphony no. 4*, mvt. IV:

e: iv⁶ ii^{°6} i iv⁶ V^{7/V} i⁶ Fr+6/i I

Tritone substitution

We’re now just a step away from something *really* cool: the use of **tritone substitution**. This involves the interchangeability of dominant seventh chords whose roots are a tritone apart — for example, a $D\flat 7$ chord may substitute for a $G 7$ chord. The roots are a tritone apart, hence the name tritone substitution. In fact, these two chords share the **same** tritone: a $D\flat 7$ chord contains the tritone $F - C\flat$, while the $G 7$ contains $F - B$. Shown just using chord symbols and Roman numerals, it would look like this:

Dmi ⁷	G ⁷	C	becomes	Dmi ⁷	D \flat 7	C
ii ⁷	V ⁷	I		ii ⁷	Gr+6/I	I

As you may be aware, this kind of harmonic technique is used frequently in jazz, though its origins are in nineteenth-century “legit” music (Liszt, Wagner, others).

Here’s another example, written out:

Bmi ⁷	E7	Ami ⁷	D7	G	Bmi ⁷	B \flat 7	Ami ⁷	A \flat 7	G
					($\flat 5$)	($\flat 5$)			

G: iii⁷ V^{7/ii} ii⁷ V⁷ I G: iii⁷ Fr+6/ii ii⁷ Fr+6/I I
TT TT
sub sub