

Chord Inversions

On an earlier worksheet we looked at a little arrangement of Pachelbel's Canon in D.



The image shows a musical score for Pachelbel's Canon in D, specifically the first four measures. The key signature is D major (one sharp) and the time signature is common time (C). The score is written for a grand staff (treble and bass clefs). The bass line consists of a sequence of notes: D, A, B, F#, D, A, B, F#. The chords in the treble clef are: D major (D, F#, A), A major (A, C#, E), B minor (B, D, F), and F# minor (F#, A, C).

D: I V vi iii IV I IV V

Here, the chords were all in “root position,” meaning that the root of the chord was always on the bottom. Thus, if you wanted a super-quick shortcut to your roman numeral analysis, you could have simply read all of the bass notes and ignored the rest!

However, that is usually not how it works. When a note other than the root is in the bass we call it an *inversion*.

third in the bass = “first inversion”



The image shows a musical score for a D major chord in first inversion. The bass line has a single note, F#, which is the third of the chord. The treble clef contains the notes D, A, and C, which are the other notes of the chord.

fifth in the bass = “second inversion”



The image shows a musical score for a D major chord in second inversion. The bass line has a single note, A, which is the fifth of the chord. The treble clef contains the notes D, F#, and C, which are the other notes of the chord.

We add a little number to our romans to indicate inversion:

I in first inversion = I⁶

I in second inversion = I₄⁶

Where do these numbers come from? They are a tradition of musical notation from around 1600 called “figured bass.”

Imagine if you wrote out the triads with just 3 notes in a neat stack, like so:



root
position



first
inversion



second
inversion

Next, you could write numbers to describe the interval shape of the chord:



5
3



6
3



6
4

However, in order to reduce clutter, the Baroque-era music printers eliminated a lot of this information -- so they considered $\overset{5}{3}$ to be “normal” and printed only the information that diverged from it.

~~5~~ 6 6
~~3~~ ~~3~~ 4

Figured bass parts were literally a bass line plus these little numbers. This was enough to tell the harpsichord player what chords to play, and he or she would simply make up the rest of the part much like a jazz pianist accompanies soloists.

Why do we still use these figures today? The simplest answer is that music is a deeply traditional discipline. All educated (Classical) musicians understand them, so you should too!

Dealing with inversions in analysis

Since it is likely that harmonies in real music will be in the different inversions, it is very important that you take a complete “inventory” of the notes before you decide what roman numeral to give. (I suggest at first that you write out the note-names above the staff and look at them.) *Then* you look at what part of the triad is in the bass and add an inversion symbol.

B \flat major

A F C
F

You see here that the chord is F-A-C, the V chord in B \flat .

(a measure from some imaginary waltz)

V 6

The bass has the third of the chord (= 1st inversion.) Thus, you add an inversion symbol, the little “6”.

Always look at the bass for inversions





This may look like a $\frac{6}{4}$ chord...

but the bass tells you it's root position!

B \flat : I

Inversion Symbols for Seventh Chords

As with triads, the figured-bass symbols for seventh chords are based on the intervallic structure of the harmony.

root position	1st inversion 3rd on bottom	2nd inversion 5th on bottom	3rd inversion 7th on bottom
			
	6 5 3	6 4 3	6 4 2

Then some redundant numbers are removed. Memorize these symbols:

6	6	6
5	4	4
5	3	2

(I like to think that the numbers tell you where the step is. $\frac{6}{5}$ means the step is between 6 and 5, and $\frac{4}{3}$ means it is between 4 and 3. It's not true for $\frac{4}{2}$, though.)

(some people also like to just use "2" for third inversion)