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A Bit of Music Theory — The Circle of Fifths and Musical Modes

The Circle of Fifths

An understanding of the “circle of fifths”, is useful for dealing with musical keys, modes and chords. A “fifth” is the interval between the first and fifth notes of any major (or minor) scale. In a C-major scale, the notes are C, D, E, F, G, A, B (and then C again, etc.). So starting at C the fifth note is G — and the interval C-to-G is called “a fifth.” In a G-major scale the notes would be G, A, B, C, D, E, F# (and G again), so G-to-D is another fifth interval.

If you keep going like that you get a sequence of all of the 12 note-names, each a fifth above the previous. The sequence is called a circle because it repeats after 12 names. Here's the whole sequence, using sharps above and equivalent flats below (using ‘b’ as a flat symbol):

C	G	D	A	E	B	F#	C#	G#	D#	A#	E#	(C ...)
C	G	D	A	E Fb	B Cb	Gb	Db	Ab	Eb	Bb	F	(C ...)

It looks like a lot to remember, but all you really need is the main sequence of names, ignoring the flats and sharps: F, C, G, D, A, E, B. If you can remember that, you can figure out the rest. (Going up after B, the sequence starts over but with sharps: F#, C#, G#, etc. Going down below F the order is the same, but with flats: from the bottom, Cb, Gb, Db, Ab, Eb, Bb, F. Cb is the same as B, so we've closed the circle.

If you play much music you probably know most of it already, from knowing the major-key signatures (numbers of sharps and flats) of the basic keys. Remember, or learn, that a one-flat key signature is F-major; no sharps or flats is C, one sharp is G, and so forth up to 5 sharps (B) — or at least to 4 sharps (E).

What good is it? Knowing the circle-of-fifths sequence is useful in several ways.

1) Helping choose chords: for example, in any major or minor key the most common chords (I, V and IV) are adjacent in the circle of fifths. (The IV chord is also the “negative-fifth” chord.) So for the key of G: the names to the right and left of G are D and C respectively. The G, D and C chords are the I, V and IV chords for the key of G. (I think of it like this: G is 1 sharp. I need G, and the chord to the right (one more sharp = 2 sharps, which is D) and also the chord to the left (one fewer sharp is 0, which is C.) So if someone calls a tune in G (and you know at least the main part of the sequence), you can guess that the three chords G, D and C are likely to be needed. (It works in minor too — for example for a tune in A-minor, the most likely three chords would be Am, Em and Dm — the Im, Vm and IVm.)

2) Interpreting key signatures: Let’s choose the more-common names from the above table rows, and number them like this, so C is zero:

-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	+6 (-6)
Gb	Db	Ab	Eb	Bb	F	C	G	D	A	E	B	F# (Gb)

When numbered this way the circle of fifths shows the number of sharps (positive numbers) or flats (negative numbers) in each of the 12 major keys. (By convention we normally limit the number of sharps or flats in a key signature to six; +6 (F#) and -6 (Gb) are the same. So although Db (5 flats) is equivalent to C# (7 sharps), we only use the former name for naming keys.)

And if you know the basic 7-name part of the sequence, plus at least one key signature (e.g. that C major has no sharps or flats), you can figure the rest out. For minor keys, see the next section on **modes**.

3) Determining scales and writing key signatures: Knowing how many sharps or flats a scale or tune has is important, but not the whole story. To play a scale you also need to know which notes are sharp or flat. In written music the key signature tells you that. But if you don't have written music, you may need to figure out which notes to adjust. You can do that with one other piece of information.

Fortunately any key+mode combination that uses a given number of sharps or flats (per the table above) has the same key signature, meaning they all use exactly the same set of sharped or flatted notes. So for example all the 2-sharp combinations (D Major, A Mixolydian, E Dorian and B minor) use F# and C#. If you know the simplest 1-sharp and 1-flat key signatures (F# or Bb), you can figure out the rest.

The order in which sharps or flats are added follows the circle of fifths: “upwards” (to the right) for sharps, “downwards” (to the left) for flats. So for example if you can remember that the single sharp in the key of G major is F#, and that the single flat in the key of F is Bb, you can easily work out the rest. Sharps go “up” the circle: F, C, G, etc. Flats go “down” the dircle: Bb, Eb, Ab, Db, etc. So for example if there are 2 sharps (D major, A Mixolydian, E Dorian or B minor), the two sharps are F# and C#.

Note: If you ever have to write a key signature (if you’re hand-writing music), it's good to know that key signatures are written in the order in which the sharps or flats were added. So for sharps, F#, C#, G#, D#, A# and E# (left to right). Similarly flats in a key signature are written in the order Bb, Eb, Ab, Db, Gb, Cb.

4) Remembering the most-common modes and their key signatures and scales. See the next section for an explantion of modes.

Modes and Alternative Scales

If you play any kind of music, you're probably familiar with major and minor "keys". You may know, for example, that if you play only white notes on a piano starting on a C, you'll get a C-major scale, while if you play the same white notes but start on an A, you'll get an A-minor scale.

It turns out that major and minor are only two of seven modes based on the diatonic scale (the common scale in “western” music), that were defined centuries ago by the ancient Greeks. Several of them sound rather strange, at least to my ear. But four of the seven are very common in old-time and (at least) Irish music: **Major** (sometimes called “Ionian mode”), **Mixolydian**, **Dorian** and **Minor** (also known as Aeolian). (Just for completeness, the other three are *Lydian*, *Phrygian* and *Locrian*.)

Many descriptions of modes are scale-based, using descriptions based on playing the white notes (or any other set of notes from a major scale), starting on various initial notes. But I find it more useful to think of modes in terms of key signatures and chords. (Of course the two ways of thinking about them are related.)

As mentioned above, the A minor scale has no sharps or flats while (as you may know, or can see from the table of major keys) the A major scale has three sharps. Similarly, any two major and minor keys with the same name (scales with the same starting note) also have key signatures that differ by three. In tabular form, we could write:

Mode:	Major	***	***	Minor
Sharps:	N sharps	N-1	N-2	N-3 sharps
A:	3#	2#	1#	no sharps

It turns out that the two most common other modes, Mixolydian and Dorian, “fit” in between Major and Minor in terms of the number of sharps they contain—in other words, where the asterisks are in the list above.
Mixolydian is a fairly “major-sounding” mode, and for a given name it has just one fewer sharp (or one more flat) than the corresponding major key (i.e., with the same root name).
Dorian is a minor-sounding mode, and it sits between Mixolydian and Minor: one more sharp than the same-name minor, one fewer than the Mixolydian.

So if we fill out the above table with the two new modes, and add rows to include the most-common keys (for old-time and blugrass music), we get something like this:

Mode:	Major	Mixolydian	Dorian	Minor
Sharps:	N	N-1	N-2	N-3
Bb:	2b	3b	4b	5b
F:	1b	2b	3b	4b
C:	—	1b	2b	3b
G:	1#	—	1b	2b

D:	2#	1#	—	1b
A:	3#	2#	1#	—
E:	4#	3#	2#	1#
B:	5#	4#	3#	2#

One thing this means is that a “key” signature doesn't tell you everything. A signature with 2 sharps could be D-Major, or A-Mixolydian, or E-Dorian, or B-Minor—or one of the “weird” modes. In the next paragraphs I'll talk about a couple of ways to distinguish these.

Modes and Chords: As mentioned earlier, for the Major and Minor modes (often called Major and Minor “keys”, though we can see that's not really correct), the most-common chords are the I, V and IV (one, five and four) chords. (For the Minor mode, it's the Im, Vm and IVm — so A-Major commonly uses A, E and D, while A-Minor commonly uses Am, Em and Dm.)

Mixolydian and Dorian use quite different chord patterns. Instead of three commonly-used chords these employ only two: the I (one) and the VII (seven) chord.

- **Mixolydian**-mode tunes most often use the major I and major VII. So a G-mixolydian tune (no sharps or flats) is likely to have lots of G and F chords, but few if any C or D chords.
- **Dorian**-mode tunes, being minor-ish, use the minor I chord — but still the major VII. So a D-Dorian tune (also no sharps or flats) is likely to use mostly Dm and CMaj chords.
- And as discussed above, a C-major tune (no sharps or flats) would likely use C, G and F, while an A-minor tune (no sharps or flats) would likely use Am, Em and Dm.

So clearly just knowing a tune is “some kind of A tune”, or how many sharps it has, is not enough for the chordal accompanists! They need to know the scale-name and the mode to know what chords to use. (In old-time music it's common to lump Mixolydian and Dorian tunes together as “modal” tunes, leaving the accompanists to figure out whether the I chord is major or minor. In either case the VII chord will be major.)

So one way to determine the mode of a tune is to consider what chords seem to work with it. (Of course many tunes call for additional chords beyond the basic three, or two. But knowing the basic chords will go a long way in helping you accompany most tunes.)

The “Home” note: Another way to guess the key-name of a tune is to try to determine the “home” note, often the last note of the tune. In many cases, though not all, the last note of the tune, or of a major phrase, will be the key-name note. That is, a tune that ends on an A note is likely to be A-something: A-Major, A-Mixolydian, A-Dorian or A-Minor. The “major-y” or “minor-y” feel of the tune is another clue: Major and Mixolydian sound major-y, Dorian and Minor sound minor-y. And finally, look to see what notes in the tune are sharped or flatted to pin down the key signature, and thus the mode. Combining this information with the set of chords that seem to fit the tune best can often suggest the mode.

But a word of caution: many tunes use different modes in different sections, or may have ambiguous modes (e.g., may have no F notes, so you can't tell if they would be natural or sharped). So don't necessarily expect a clear, or even a single, answer. Music is not a hard science!

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