

# **Note on Music Theory**

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## **Abstract**

This note is about the music theory, based on the book [\[1\]](#).

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## 1 Introduction to triads and seventh chords

There are four possible ways to combine major and minor 3rds to produce a tertian triad, see Example 1.1. The names for the members of a triad are 'base', 'third' and 'fifth', respectively.

- Augmented triad.  $M3 + M3 = +5$ . Denoted by '+'.
- Major triad.  $M3 + m3 = P5$ . Denoted by 'M'.
- Minor triad.  $m3 + M3 = P5$ . Denoted by 'm'.
- Diminished triad.  $m3 + m3 = ^\circ 5$ . Denoted by '°'.

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**Example 1.1** Four kinds of triads.

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The image shows a musical staff with a treble clef and a common time signature (C). It contains four triads, each in a different key signature and voicing. The first triad is augmented major (C major with an augmented fifth) in C major. The second is minor (C minor) in C minor. The third is diminished (C diminished) in C minor. The fourth is augmented major (C major with an augmented fifth) in C major. The labels 'augmented major', 'minor', and 'diminished' are written below the staff, with 'major' appearing to be shared between the first and fourth triads.

Adding a 7th on the top of the base of a triad makes a 7th chord. There are many seventh chords, in which five kinds are most common in tonal music, see Example 1.2. The constructions and symbols are listed below.

- Major seventh. Major triad with major 7th. Denoted by 'M7'.
- Major-minor seventh. Major triad with minor 7th. Denoted by 'Mm7'.
- Minor seventh. Minor triad with minor 7th. Denoted by 'm7'.
- Half-diminished seventh. Diminished triad with minor 7th. Denoted by '°7'.
- Diminished seventh. Diminished triad with diminished 7th. Denoted by '°7'.

There are three possible bass positions for triads, corresponding to three inversions with the root, 3th and 5th being the bass, called the root position, first inversion and second inversion. There are four inversions for seventh chords, namely the root position with the root being the bass, the first inversion with the 3rd being the bass, the second inversion with the 5th being the bass, and the third inversion with the 7th being the bass.

**Example 1.2** Five common kinds of seventh chords.

The image shows five chords on a treble clef staff in C major, each in a different inversion. From left to right: a major chord (C major), a major-minor chord (F major), a minor chord (C minor), a half-diminished chord (F minor), and a diminished chord (C diminished). The chords are labeled below the staff: major, major-minor, minor, half-diminished, and diminished.

In the Baroque system, the figured bass symbols consisted basically of numbers representing intervals above the bass to be formed by the members of the chord. However, in Baroque system, root is not concerned. Now we often use figured bass system to denote the inversion of a chord, see Table 1.

Lead-sheet symbols are also used to denote the chords. The chords in Example 1.1 are denoted as G+, G, Gm, Gdim or G°. The chords in Example 1.2 are denoted as FM7 or FΔ7, F7, Fm7, Fm7♭5 or F<sup>ø</sup>7, Fdim7 or F<sup>o</sup>7.

We now consider the diatonic chords in major and minor keys.

The diatonic triads in major key is I, ii, iii, IV, V, vi, vii°. For differet kinds, we list as below.

- Major triad: I, IV, V.
- Minor triad: ii, iii, vi.
- Diminished triad: vii°.
- Augmented triad: none.

**Example 1.3** Common diatonic triads in c minor.

The image shows seven diatonic triads in C minor on a treble clef staff. From left to right: C minor (i), D minor (ii), E minor (iii), F major (III), G minor (iv), A minor (v), and B diminished (vii°). The chords are shown in their root position.

There are different forms of minor scales so there are a lot more diatonic triads in minor key. The common ones have the root being in the harmonic minor scale: i, ii°, III, iv, V, VI, vii°. The c minor diatonic traids are shown in Example 1.3. All the notes are also in the harmonic scale with the exception of the 5th of the III chord. Different kinds are listed below.

- Major triad: III, V, VI.
- Minor triad: i, iv.

Table 1: Inversions of chords

Complete figured bass symbol	5 3	6 3	6 4	7 5 3	6 5 3	6 4 3	6 4 2
Symbol most often used		6	6 4	7	6 5	4 3	4 2

- Diminished triad:  $ii^\circ$ ,  $vii^\circ$ .
- Augmented triad: none.

Diatonic seventh chords in major key include  $I^{M7}$ ,  $ii^7$ ,  $iii^7$ ,  $IV^{M7}$ ,  $V^7$ ,  $vi^7$ ,  $vii^{\circ 7}$ . Different kinds are listed below.

- M7:  $I^{M7}$ ,  $IV^{M7}$ .
- Mm7:  $V^7$ .
- m7:  $ii^7$ ,  $iii^7$ ,  $vi^7$ .
- $\emptyset^7$ :  $vii^{\emptyset 7}$ .
- $^\circ 7$ : none.

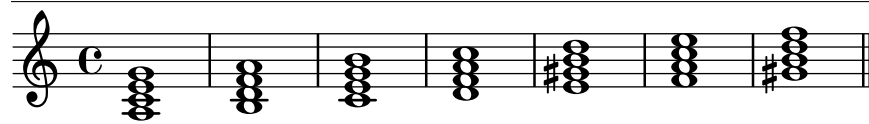
Commonly used diatonic chords in minor shown in Example 1.4. They are  $i^7$ ,  $ii^{\emptyset 7}$ ,  $III^{M7}$ ,  $iv^7$ ,  $V^7$ ,  $VI^{M7}$ ,  $vii^{\circ 7}$ . different kinds are listed below.

- M7:  $III^{M7}$ ,  $VI^{M7}$ .
- Mm7:  $V^7$ .
- m7:  $i^7$ ,  $iv^7$ .
- $\emptyset^7$ :  $ii^{\emptyset 7}$ .
- $^\circ 7$ :  $vii^{\circ 7}$ .

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**Example 1.4** Common diatonic seventh chords in c minor.

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## 2 Principles of voice leading

### References

- [1] Stefan Kostka. *Tonal harmony: with an introduction to post-tonal music*. McGraw-Hill Education, New York, NY, 2018.