MTO 16.1 Examples: Tymoczko, Geometrical Methods

(Note: audio, video, and other interactive examples are only available online)
http://www.mtosmt.org/issues/mto.10.16.1/mto.10.16.1.tymoczko.php

Figure 1. The *Tonnetz*. Points represent notes, while major and minor triads are represented by triangles
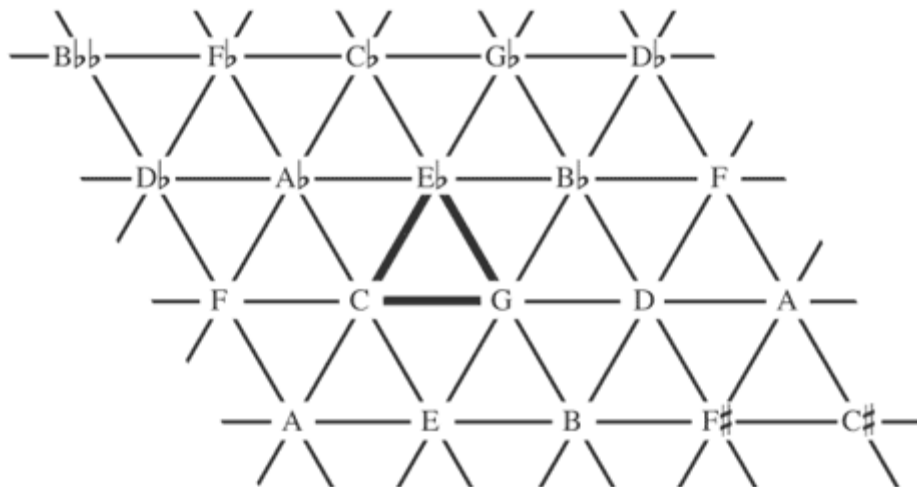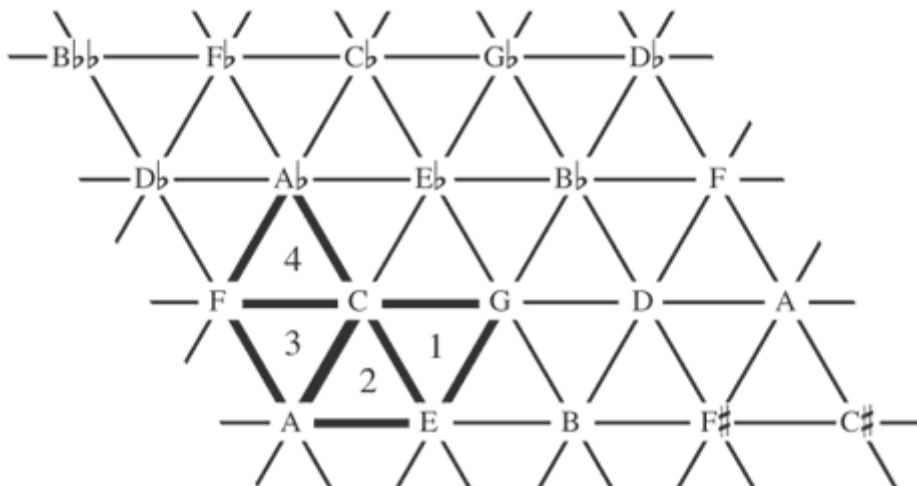
Figure 2. (a) On the *Tonnetz*, F major (triangle 3) is closer to C major (triangle 1) than F minor (triangle 4) is. Consequently, the voice-leading (C, E, G)→(C, F, A) is represented a two-step motion, while it takes at least *three* steps to represent (C, E, G)→(C, F, A♭). (b) In actual music, however, F minor frequently appears as a passing chord between F major and C major.
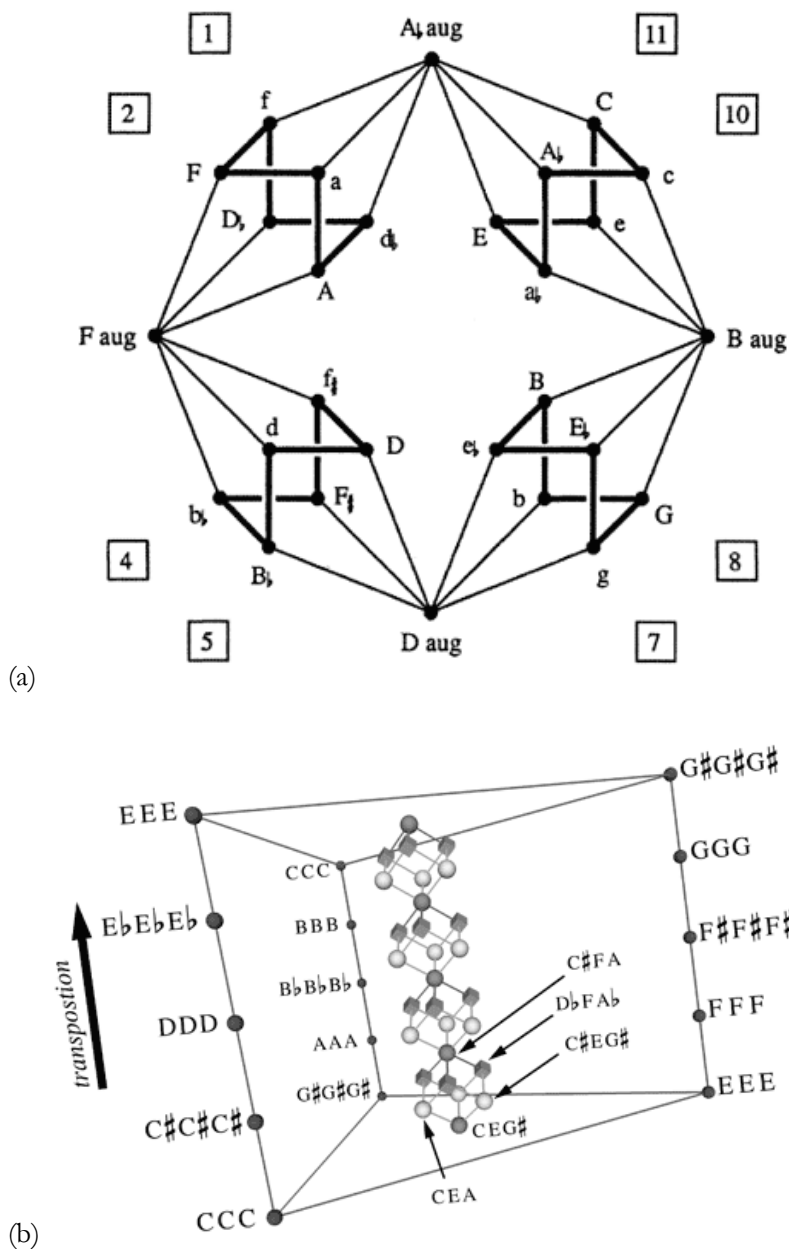
(a)

(b)

Figure 3. Douthett and Steinbach's "Cube Dance" as it appears in their original article (a) and as it is embedded in the center of three-note chord space (b).

(a)

(b)

In the original representation, clockwise steps—e.g. from C to c or C to e, or e to B aug—represent descending semitonal motion, while counterclockwise steps represent ascending motion; in Figure 3(b), ascending and descending musical motion are represented by ascending and descending graphical motion. (Note that the top of this graph is glued to the bottom with a 120° twist.) The embedding can be used to show that every consistently clockwise or counterclockwise path on Douthett and Steinbach's figure represents a particular voice leading, with the length of the path corresponding to the size of the voice leading. Furthermore, since the graph contains every "interscalar transposition" (Tymoczko 2008) between all of its chords, it necessarily contains a minimal voice leading between any two of them.

Figure 4. Rockwell's "Birdcage Graph," showing voice leading among minor triads and dominant seventh chords. Two chords are connected by an edge if they can be linked by two single-semitone voice-leading motions.
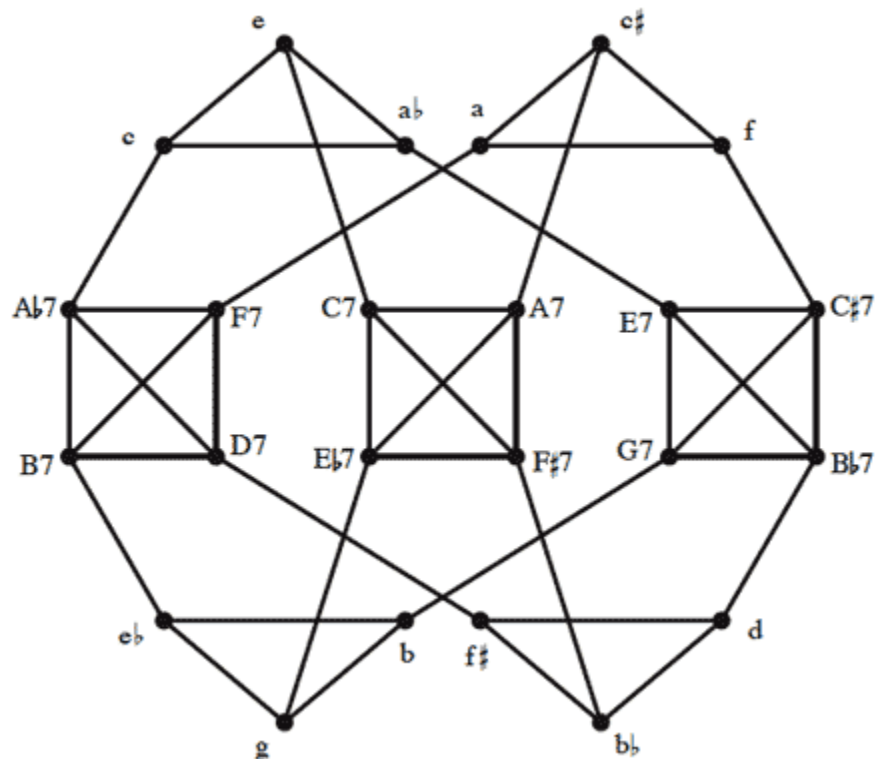

Figure 5. The voice leadings on Rockwell's graph can be combined in multiple nonequivalent waysThe voice leadings on Rockwell's graph can be combined in multiple nonequivalent ways: the pair of bass motions in (a) cancel out, while no motions cancel in (b). As a result, the composite voice leadings (formed by taking the first and last chords) have different sizes.

Figure 6. This graph faithfully reflects single-semitone voice-leadings among single notes, semitones, and three-note chromatic clusters. However, the larger distances do not reflect voice-leading distances.