

Multidimensional Musical Objects and the One-Dimensional Musical Space

Jason Patterson

Division of Music History, Theory, and Ethnomusicology

Musical Objects and Corresponding Dimensions

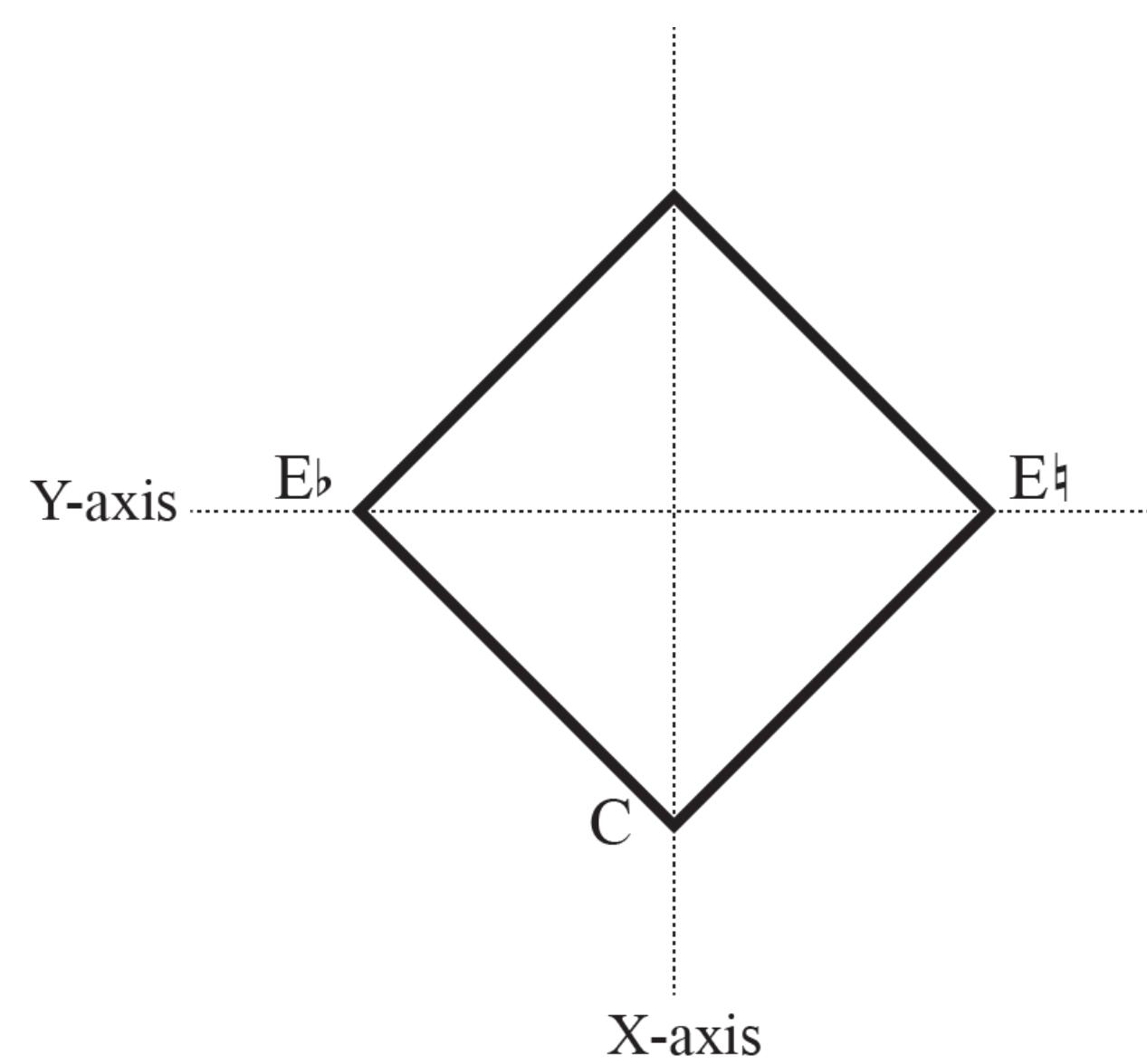
One-Dimensional Musical Object

- The coordinate of the X dimension is the position of the fundamental tone
- This fundamental tone can generate one consonant triad
- No rotations are possible



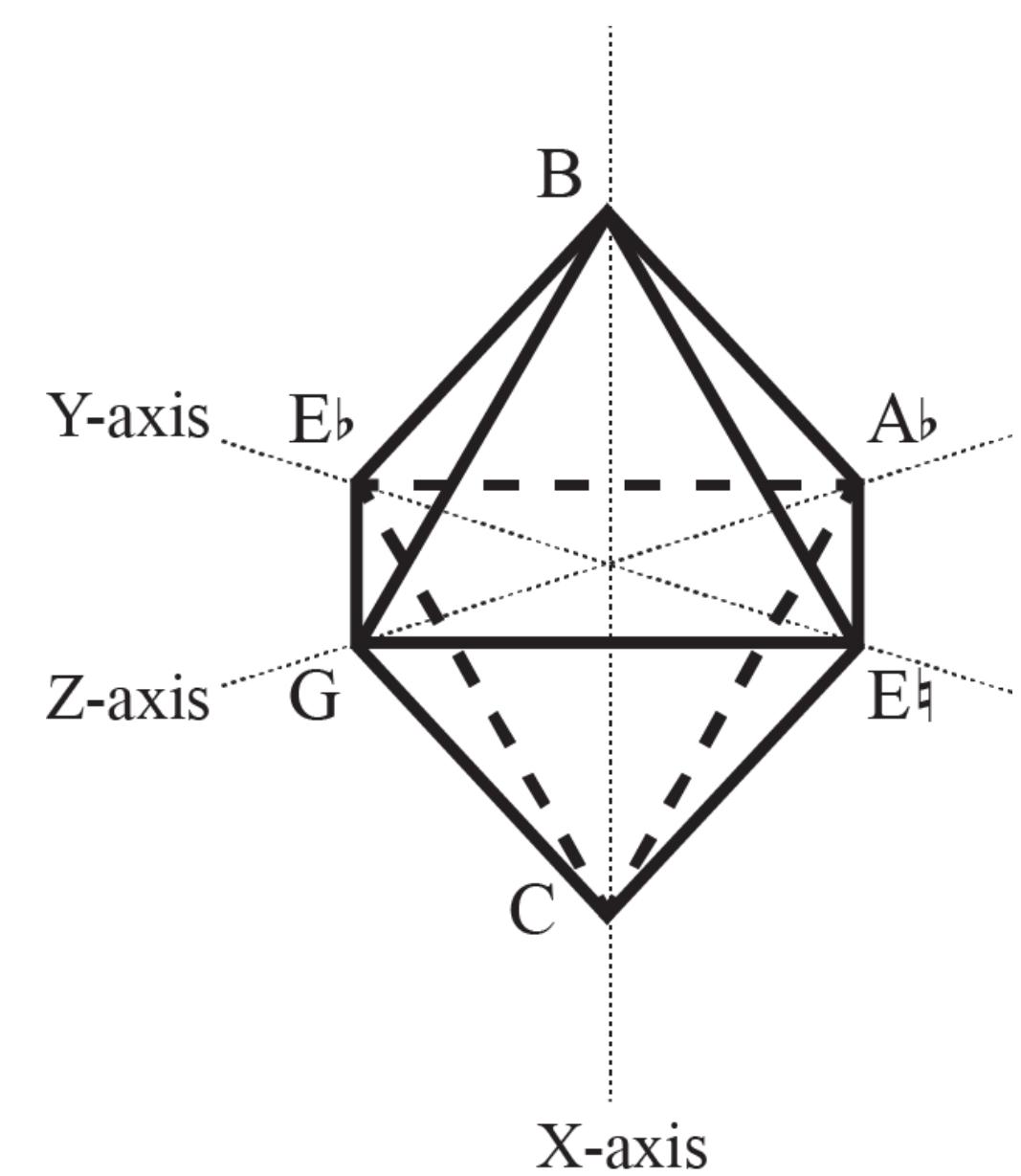
Two-Dimensional Musical Object

- The coordinate of the Y dimension is the position of the third
- A 2-D MO encompasses both the major and minor thirds
- Can be composed out through a Y rotation



Three-Dimensional Musical Object

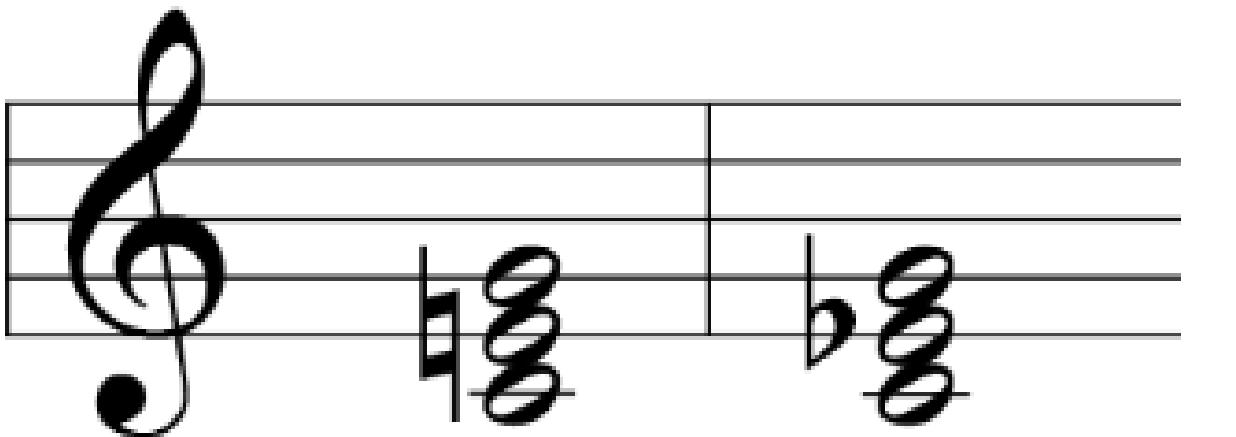
- The coordinate of the Z dimension is the position of the fifth
- A 3-D MO encompasses 8 triads; 6 from the hexatonic cycle and 2 augmented triads
- Can be composed out through an X, Y, or Z rotation



Perception of Consonance and Dissonance

One-Dimensional Musical Space

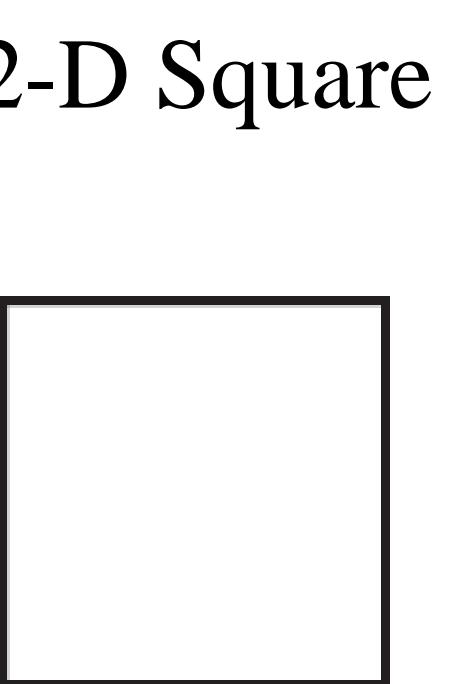
1-D Musical Objects



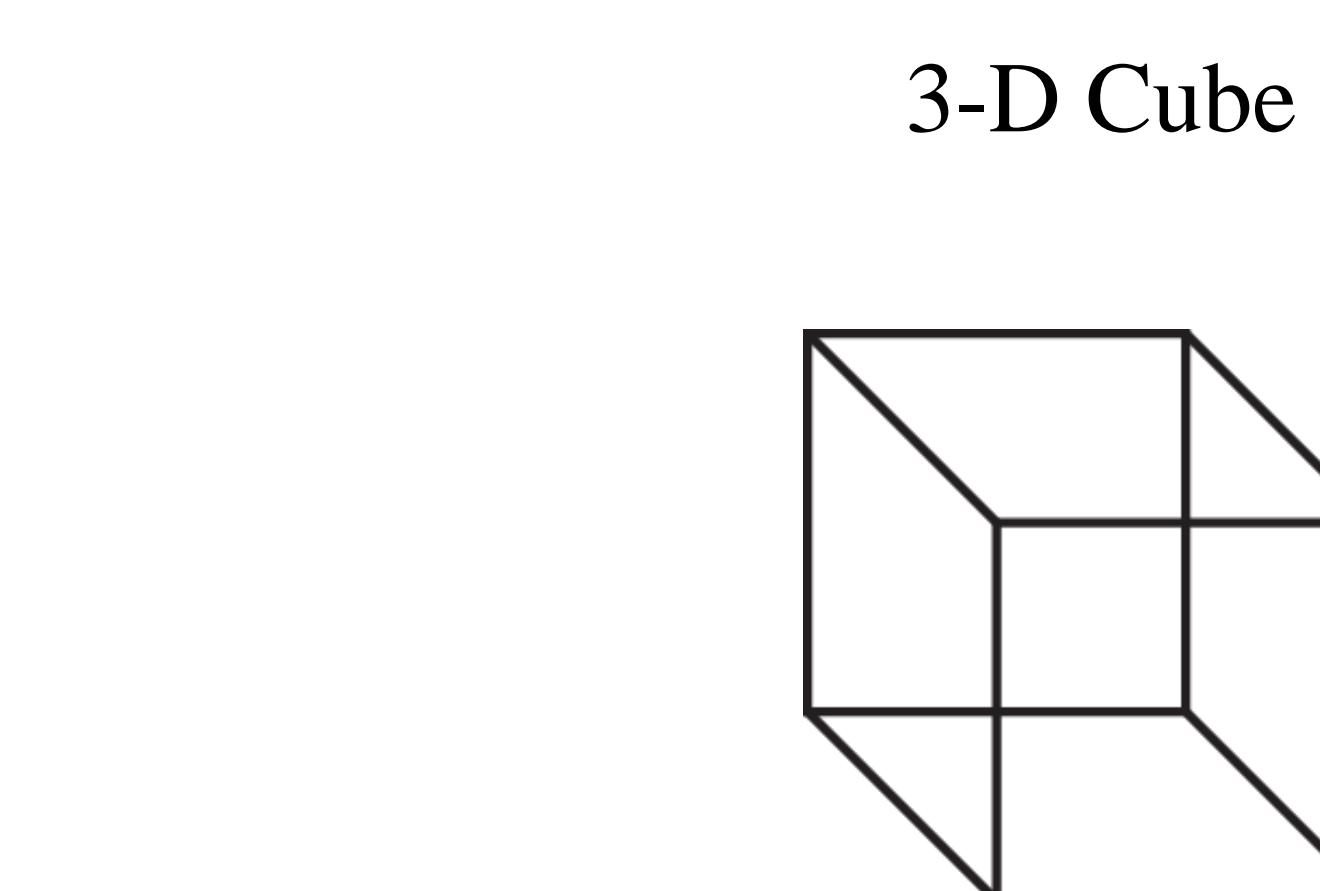
Consonant

2-D Square

Two-Dimensional Visual Space



Dissonant



2-D Musical Object

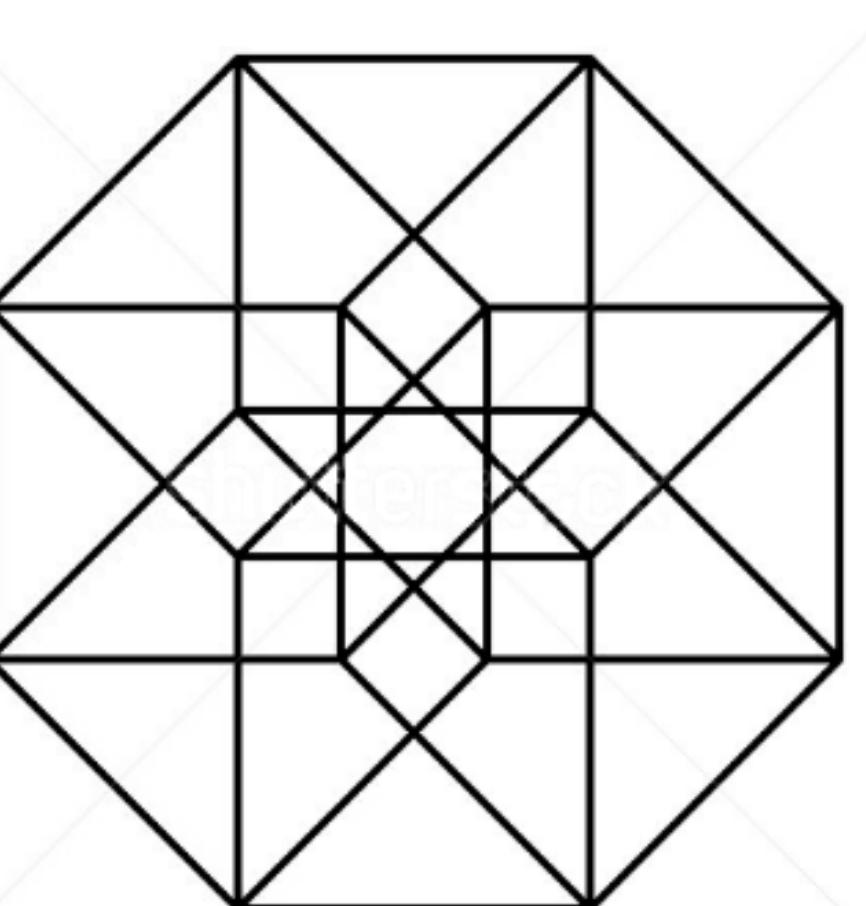


More Dissonant

3-D Musical Object

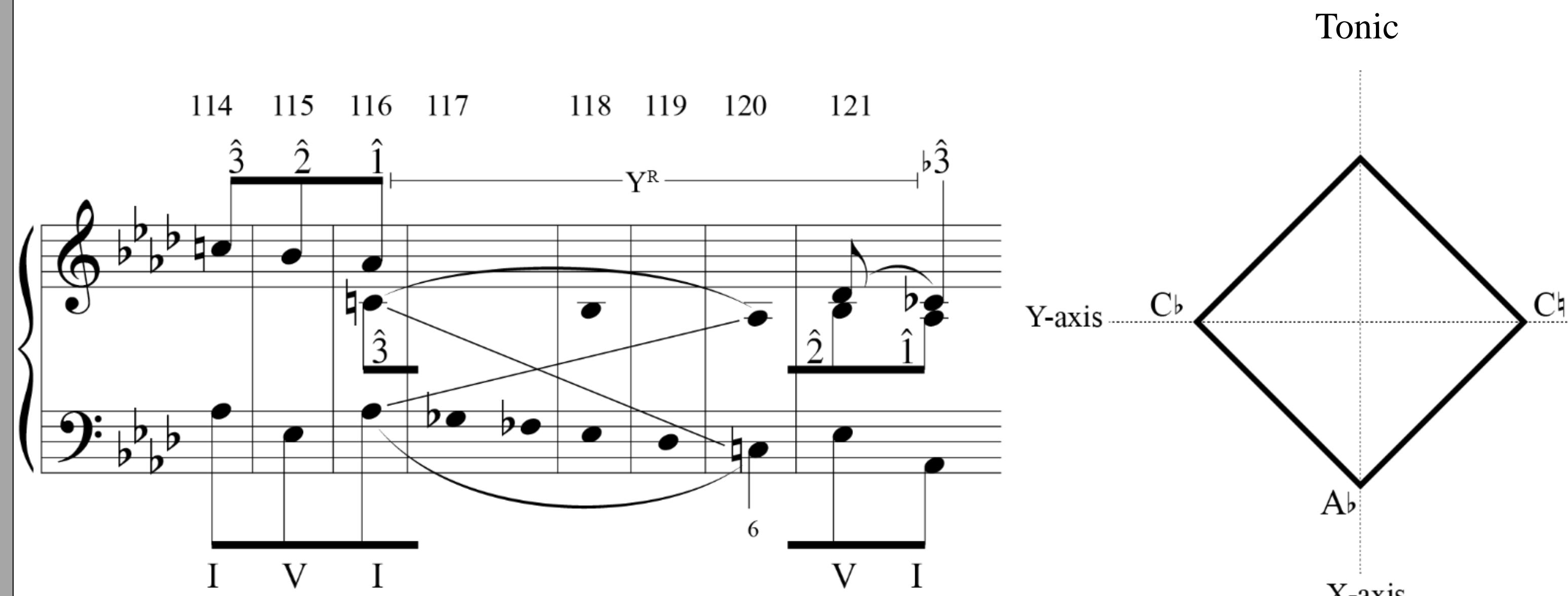


4-D Hypercube

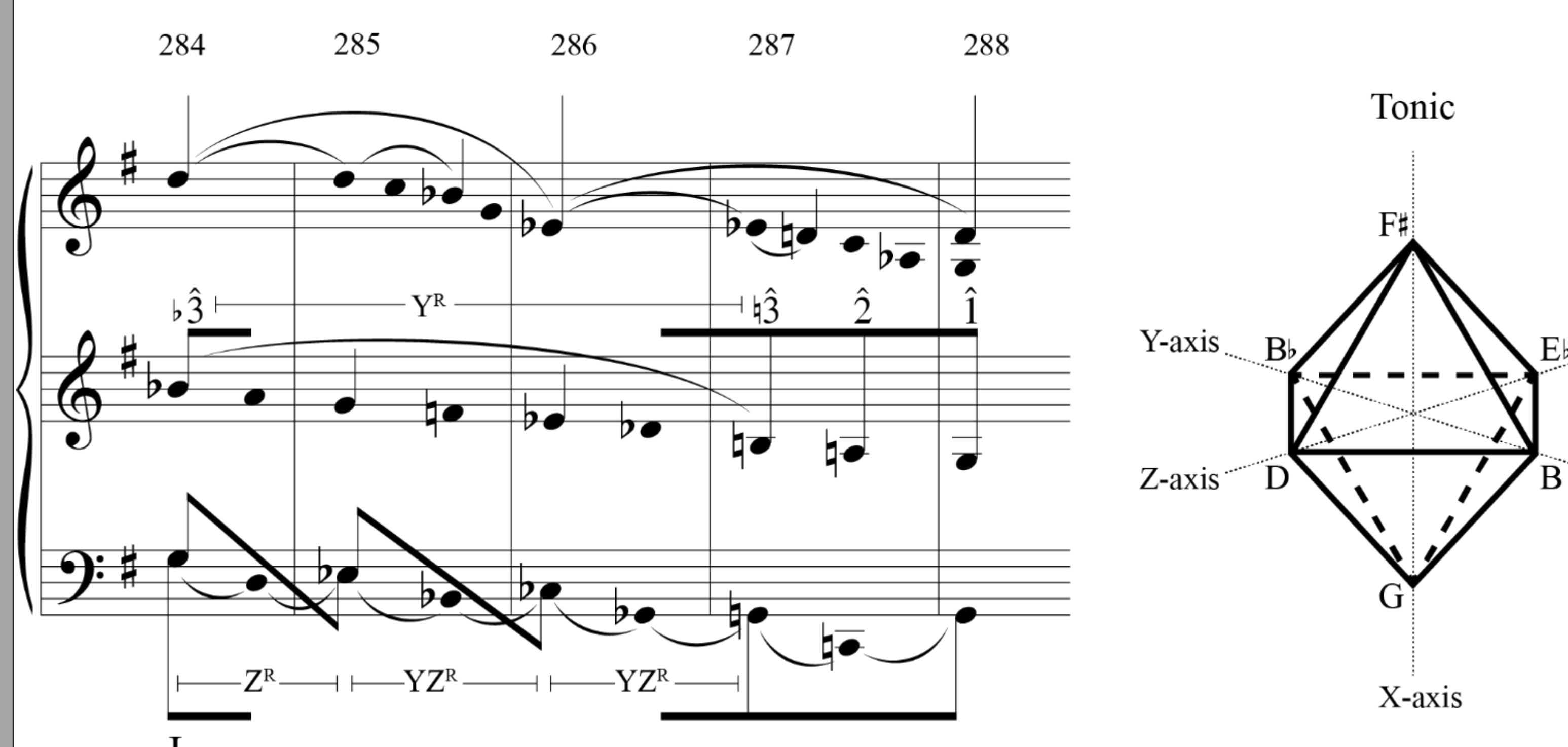


Rotating Multidimensional Musical Objects in Mahler's Seventh Symphony

2-D Tonic Object, Second Movement, mm. 114-121



3-D Tonic Object, First Movement, mm. 284-288



Conclusion

Traditional Schenkerian analysis is typically limited to the triad as the fundamental element of composition, largely because musical objects are assumed to be confined within one dimension of musical space. Works that challenge this limitation are forced into models that compromise their structural integrity. Multidimensional musical objects can provide a way for the analyst to trace more accurately middleground and background unfoldings that would otherwise be misinterpreted in function and voice leading.