Invited Talk

"The Geometry of Consonance"

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Abstract

In my talk, I will describe five properties that help make music sound tonal -- or "good," to most listeners. I will then show that combining these properties is mathematically non-trivial, with the consequence that space of possible tonal musics is severely constrained. This leads me to construct higher-dimensional geometrical representations of musical structure, in which it is clear how the various properties can be combined. Finally, I will show that Western music combines these five properties at two different temporal levels: the immediate level of the chord, and the long-term level of the scale. The resulting music is hierarchically self-similar, exploiting the same basic procedures on two different time scales. In fact, one and the same twisted cubic lattice describes the musical relationships among common chords and scales.

Biography

Dmitri Tymoczko is a composer and music theorist who is an Associate Professor at Princeton University. He was born in 1969 in Northampton, Massachusetts. He studied music and philosophy at Harvard University, where his primary teachers were Milton Babbitt, Leon Kirchner, Bernard Rands, Stanley Cavell, and Hilary Putnam. In 1992 he received a Rhodes Scholarship to do graduate work in philosophy at Oxford University. He received a Ph. D. in music composition from the University of California, Berkeley, where his teachers included Jorge Liderman, Olly Wilson, David Milnes, Steve Coleman, Richard Taruskin, and Edmund Campion.

Dmitri’s music has won numerous prizes and awards, including a Guggenheim fellowship, a Charles Ives Scholarship from the American Academy of Arts and Letters, two Hugh F. MacColl Prizes from Harvard University, and the Eisner and DeLorenzo prizes from the University of California, Berkeley. He has received fellowships from Tanglewood, the Ernest Bloch festival, the Mannes Institute for Advanced Studies in Music Theory, and has been the composer in residence at the Radcliffe Institute for Advanced Study, and was awarded the Arthur Scribner Bicentennial Preceptorship from Princeton University. His music has been performed and by the Brentano Quartet, the Pacifica Quartet, Ursula Oppens, the Network for New Music, the Synergy Vocal Ensemble, the Gregg Smith Singers, the Janus Trio, the Cleveland Contemporary Youth Orchestra, the San Francisco Contemporary Players, and others. In addition to composing concert music, Dmitri enjoys playing rock and jazz.

Dmitri’s writing has appeared in the Atlantic Monthly, Boston Review, Civilization, Integral, Lingua Franca, Music Theory Online, Music Theory Spectrum, and Transition. His 2006 article “The Geometry of Musical Chords” was the first music theory article published by Science in its 127-year history, and was discussed in Time, Nature, The Washington Post, The Boston Globe, NPR, Physics Today, and elsewhere. As a result of this work, he has been invited to speak to audiences of physicists, musicians, philosophers, mathematicians, and geneticists. He is currently writing a book for Oxford University Press about what makes music sound good.