Spaces

In the readings for this week, I was surprised by the number of approaches the authors took to the same basic topic. The seemingly straightforward idea of mapping out pitches, pitch classes, or set classes in geometric space takes on a high level complexity in the various methodologies. In Western notation, pitches are already conceived in a very basic space: the two dimensional plane of the score, which serves to indicate pitch and duration in our current twelve semitone, equal-tempered scale. Relative ideas of chord quality (how close or far the notes are on the page) and exact intervals are already bound up in their graphic representation. But when expressed in the more abstract worlds of pitch class and set class, where literal pitch register and lines usually fall out, chords and their connections are not so easily understood. Each author takes a unique strategy for determining what and how to represent musical entities in space.

Straus (2005) expands his earlier models of atonal voice leading (Straus 2003) and generalizes his thoughts to include all cardinalities. His main methodology remains the same as before: given two set classes, determine how closely the voice leading from one to the other conforms to the best standard T/I transformation. The semitonal offset (the deviation away from one of these transformations) represents the measure of difference between the set classes, and Straus uses it to plot distances in a generalized set-class space. Set classes are nodes connected directly to nodes that are only one offset away.

The result is a master space of set classes from all cardinalities, broken down into various levels and dimensions. For higher cardinalities, the space becomes increasingly difficult to comprehend in a two dimensional plane. Personally, I found the inclusion of multiple set classes
in single nodes, beginning with cardinality $n = 5$, to be a bit confusing, but I was impressed with Straus’s ability to represent connections between stacks and tiers quite successfully.

Straus does a good job of interpreting his new abstract spaces, and notices one main trend. Maximally chromatic set classes (like 3-1, 4-1, etc.) and dispersed or maximally even set classes (3-12, 4-28) fall in opposite corners of the space. As one moves from the chromatic corner to the even one, set classes become more and more spacious. One thing irked me about Straus’s methodology here. He tends to focus on the chromatic end of the spaces, as he summarizes:

Set-classes that lie in close proximity to the maximally chromatic set-classes tend to share intervallic and subset content and would normally be judged as relatively similar by any of the existing measures of set-class similarity. Set-classes that lie in close proximity to the maximally even set-classes, however, tend to be much more varied in their sonic quality. As a result, I focus here primarily on the quality of chromaticness, while continuing to maintain casually that this quality is understood in part in opposition to the less well-defined quality of evenness. (Straus 2007, 71)

I suppose I would have liked a more thorough discussion of just how the sonic quality of relatively spacious set classes varies, though I think it is easy enough to understand from an intuitive basis.

I was somewhat surprised as well by the relative lack of intervals in Straus’s discussion. Set class quality and evenness are most often defined by interval content, and though he summarizes Quinn’s findings on the similarity of similarity measures, I found it a bit of difficulty for me. In atonal theory, I find intervals to be the most important perceptual phenomena. I understand that they are wrapped up in the usual Fortean taxonomy of set classes, but they perhaps could have been dealt with more explicitly. I was glad to see the emphasis Straus paid to intervals in his 2011 article on contextual-inversion spaces. In his generalization of the standard Neo-Riemannian transformations (P, L, and R and their obverses), Straus posits a convincing
way to map motion between set classes that retain or flip intervallic relations for set classes other
than the major and minor triads (3-11) and for larger cardinalities (especially $n = 4$). In his two
articles, then, Straus generalizes the two principle concerns of Neo-Riemannian theory:
 parsimonious voice leading and its contextual inversions.

Tymoczko (2011), like Straus (2007), deals with voice leading spaces. His geometry is a
well-constructed map of pitch class space that explicitly addresses my thought at the beginning
of this essay. Tymoczko writes:

> Geometry can help to sensitize us to relationships that might not be immediately
> apparent in the musical score. Ultimately, this is because conventional musical
> notation evolved to satisfy the needs of the performer rather than the musical
> thinker: it is designed to facilitate the translation of musical symbols into physical
> action, rather than to foment conceptual clarity … Learning the art of musical
> analysis is largely a matter of learning to overlook the redundancies and
> inefficiencies of ordinary musical notation. Our geometrical space simplifies this
> process, stripping away musical details and allowing us to gaze directly upon the
> harmonic and contrapuntal relationships that underlie much of Western
> contrapuntal practice. (Tymoczko, 79)

Some musicians that participate in Tymoczko’s “extended common practice” (including jazz,
minimalism, rock early polyphony) do not rely on traditional scores, and his geometry helps to
model the voice leading concerns that gird their spaces. Though he takes voice leading as a
starting point like Straus, Tymoczko focuses on essentially tonal language, rather than Straus’s
more general musical (often atonal) phenomena. I always find Tymoczko’s work fascinating, but
I am often distracted by his underlying tonal biases. It’s almost as though he sets up his spaces
and methodologies to prove what he already believes, rather than exploring options completely
or impartially. I think this is an especially egregious error for a theorist who doubles as a
composer and a teacher of composition.\(^1\) But, then again, his geometry is based on his own

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\(^1\) As an anecdotal side note, none of my composer friends at the University of Washington had ever heard of
Tymoczko. When I played some snippets of his music for them, they claimed he sounded like a “bad Hindemith.”
musical intuition and understanding, which should be a foundation for a theory of music, and this chapter has much to recommend it.

Moving along, Quinn (2006/7) takes a quite separate approach from the other two authors we read this week. Instead of gauging smoothness or closeness of voice leading between set classes, Quinn investigates chord quality and similarity as they relate to balance in various ways. In other words, Quinn employs a harmonic approach to set class quality rather than using a voice leading strategy. His methodology is often difficult to follow, and his mathematical rigor is generally demanding. But the end result is a rewarding journey in harmonic chord space and quality space, which Quinn shows to be different geometric representations of the same topology; harmonic spaces are folded up into quality spaces. I found Quinn’s engagement with intervals to be quite revealing, though a summary of his Intervallic Half-Truth is well beyond the purview of this essay.

In the end, Quinn’s explanation of chord qualities and their relationship with prototypes shares a basic thought with Straus’s voice leading methodology. As Straus summarizes: “For all of these subspaces, and for the master space of all cardinalities, however, the same principle applies: the relative chromaticness of set-classes can be meaningfully evaluated by measuring, in semitones of offset, their distance from some maximally chromatic set class.” (Straus 2005, 71).

For each of these authors, maximally even and maximally chromatic set classes provide a sort of litmus test for measuring quality. How composers choose to move employ chromaticness and evenness can be tracked in a meaningful and engaging way in set class space. It is up to the analyst to describe and then, more importantly, to interpret the changing qualities in a piece.