Basic Set Theory continued:

Keep in mind what pc set relationships tell us, and what they don't tell us. They demonstrate various forms of harmonic connection, and connect the vertical and harmonic dimensions of musical structure. A pc set transformation preserves neither order nor contour but *does* preserve 1) a one-to-one correspondence between individual elements, and 2) the interval-class content of each set. Transposition preserves the interval size and succession of the set; inversion on the other hand will preserve interval *order* while reversing interval *contour*. Both represent a process of mapping each element of the source set onto one unique element in its transformation.

The **complement** of a given set, whether literal or abstract, may prove an important relationship in the composition. The **set-class list** represents a condensed guide to the features and possible relations among sets of both the same and different cardinalities. **All-interval** tetrachords include one of each possible interval. The **Z-relation** marks those select sets of the same cardinality that have the same interval content but don't map onto one another. The interval vector can be used to determine the number of **common tones** between a given set and its transposition. The number of common tones at a given transposition is equivalent to the number of times the transpositional value occurs in the set (except at ic6, which =2 (each maps onto the other)). The inversion invariance vector can be used to determine the number of **common tones** between a given set and its inversion:

(016) 0+1, 0+6, 1+6 = <100011>

Transposition at T1 holds one pitch invariant: [1, 2, 7]; Transposition at T2 holds 0 pitches invariant: [2, 3, 8], . . . Transposition at T6 holds two pitches invariant: [0, 6, 7]

In this case we make a pitch sum matrix (addition table). The number of common tones at a given inversion is equivalent to the number of times the inversional value occurs in the table (and will tell us exactly which pcs remain invariant under that TnI, the two which sum to form it)

	0	1	6
0	0	1	6
1	1	2	7
6	6	7	0

T0I holds pcs 0 and 6 invariant = [6, E, 0]; T2I holds pc 1 invariant = [8, 1, 2]

Segmentation and the Musical Surface

Attention to the audible structure of a work is even more important in post-tonal music than in common practice period music, where we have shared structure as well as stylistic conventions to guide us. We need to be aware of the abstract structure that may underlie a work while remaining sensitive to those aspects of the structure actually exploited by the music. We may find many possible pitch, pitch-class, rhythmic, set-class and transformational relationships, but there may be a limited number that actually explain how we perceive and cognize a piece.

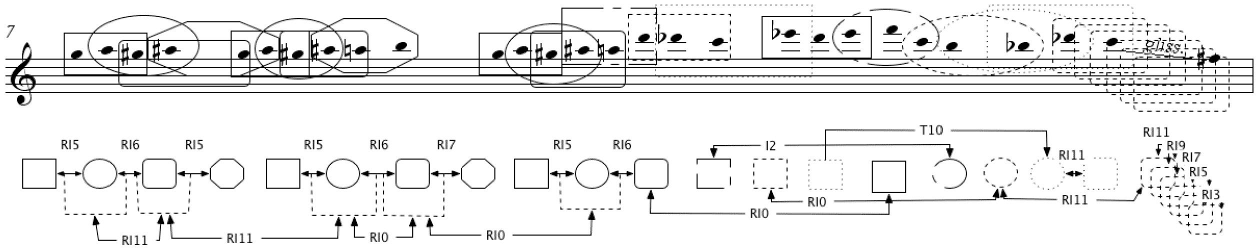
Analysts refer to this as the problem of segmentation: how do we parse the unique post-tonal work, which may or may not have a connection to any other work and may or may not be constructed with a known compositional method? This is the work we do pre-analysis, but it is in a real sense analytic, because it determines which musical features actually deserve a role in our description of a piece.

The following is an incomplete list of features one might use as both guides to segmentation and as features that–by virtue of *either* inclusion or omission–might determine our analytic goals. Keep in mind that the sameness and difference of any parameter is largely a matter of context; in a predominately whole-tone work, any half-step would draw attention to itself, but there would be so many replications of the same tri- and tetrachords that their identification as such–much like the identification of the major/minor triad as foundational in tonal music–may prove trivial. With similar logic, one might find it interesting if a symmetrical pc set were consistently disposed in space to *sound* symmetrical (e.g., if the pc set (027) were represented as the vertical sonority C#3-G#3-D#4), or if a symmetrical tetrachord such as (0347) were used in a manner that obscured its symmetry (C#4-D4-Bb4-F5).

In general we're on safe ground noting *associative* relationships: pitch and interval recurrence, rhythmic and pitch-class motivic repetition, and any other pattern that recurs on some level of the composition. A list of other connections would include:

- Rhythm:
  - expansion and contraction,
  - syncopation,
  - metric or other accentual patterns,
  - rhythmic motives or striking figures
- Melody:
  - general shape,
  - notable aspects of contour (disjunct, stepwise, prominent high or low notes),
  - motivic association, penetration or saturation
- Intervals:
  - intervallic concentration,
  - adjacencies,
  - successive patterns,
  - forms of intervallic equivalence (ordered pitch, unordered pitch, ordered pitch-class, interval class),
  - interval-class content.
- Harmony (Pitch sets or pitch-class sets):
  - pitch set equivalence (same exact notes),
  - pitch-class set equivalence (Normal or Prime form in transposition or inversion),
  - pitch(-class) set complementation (the pitch or pitch-class set that would complete the aggregate),
  - pitch-class set function (closing vs. opening),
  - pitch-class set expansion or contraction,
  - other forms of pitch-class set equivalence (Forte's Rp relation, and others),
  - pitch-class set super- and subsets,
  - pitch-class set networks,
  - pitch-class set intersection,
  - pitch-class set distribution,
  - pitch-class set density
- Timbre and orchestration (alike or contrasting)

Network diagrams are often used to represent pitch-class set transformations in the abstract. Within a network of nodes connected by arrows, notes represent objects (usually pc sets, although any aspect of the music could be transformed), and arrows represent operations on those objects (such as transposition and inversion, although Lewin often combines several operations into one function, as in the RICH transformation, or Retrograde Inversion chain, shown below).



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