Forte’s post-tonal theory in overview

“Emic” and “Etic” Analysis

Structuralist accounts of human behaviour in anthropology and ethnomusicology often distinguish between “emic” and “etic” data and analyses. This distinction may be made also in music analysis, if we regard pieces (as we normally do) as external to the analyst.

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The terms come from the distinction between “phonemic” and “phonetic” in language.

Phonemic distinctions are those between different sounds that cause differences of meaning to competent speakers. Example: /k/in/ versus /t/in/ [difference between /k/ and /t/]

Phonetic distinctions are those between different sounds whether or not they cause differences of meaning to competent speakers. Examples: /k/ in /k/i/n/ and /s/k/i/n/; or /l/ in /l/o/t/, /b/l/o/t/ and b/o/tt/le/ – different phonetically in every case but the same phonemically.

The contrapuntal models we were looking at last week are prime examples of "emic" analysis: although traditional theory does not quite recognize them as such, they depend on the rules of counterpoint that have been well known to all competent musicians composing in the last few hundred years.

"Etic" analysis has been attempted too, even though it may never really be a genuine possibility; a lot of semiotic analysis has aimed to be thoroughly "etic", taking nothing for granted in advance.

For atonal music, short of 12-tone music, which has its own rules, there are problems in finding rules that might be regarded as emic.

In consequence, **Allen Forte** suggested a basically etic approach to atonal music, in his book ***The Structure of Atonal Music*** **(New Haven and London: Yale University Press, 1973)**: however "scientific" it may appear, it is essentially a common-sense, empirical, pragmatic approach to analysis, which seeks to avoid any presuppositions.

It is very widely drawn upon in the analytical literature, so some familiarity with its terminology and its approach are advisable.

1. **Pitch-class (pc) sets**:

   Pc-sets are defined as collections of pitches, assuming

- octave equivalence [so all C’s, for example, are regarded as equivalent regardless of the octave in which they occur]
- transpositional equivalence [so a set C-D-E is regarded as equivalent to a set D-E-F#, for example]
- enharmonic equivalence [so B flat is regarded as equivalent to A sharp, for example].

For these sets, an *integer notation*, 0-11, is used, so that octave equivalence can be expressed as a remainder of *x*/12; the notation for a set is in the form [*a*, *b*, *c*, …] – using square brackets and separating the members of the set with commas.

2. Ordering of sets:

We distinguish between

- ***ordered*** sets (where [a, b, c] ≠ [c, b, a]) and
- ***unordered*** sets (where [a, b, c] = [c, b, a])

A composition is likely to contain more than one pc-set, and confronted with more than one set, we need to be able to relate them to each other.

Usually there is no reason to assume that sets are ordered. On the assumption that the sets in an atonal piece are unordered sets, we need to reduce then to ***normal order*** (i.e. involving collections with the smallest possible range, after transposition, inversion and permutation), and then to ***prime form*** (i.e. normal order transposed so that the first integer is 0).

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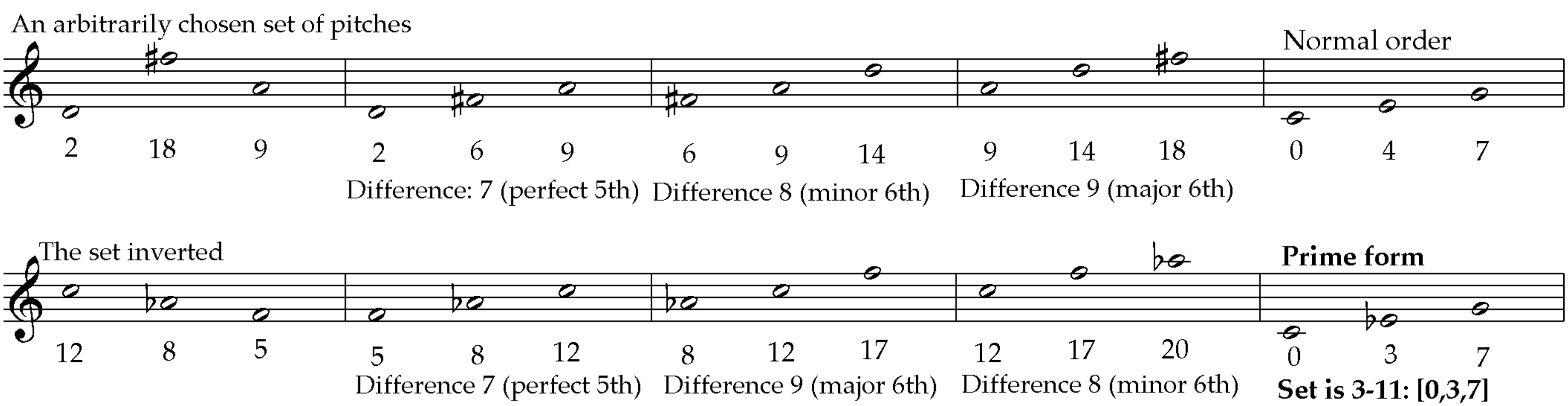


3. **Equivalence of sets**:

   Sets are equivalent if they are reducible to the same prime form, by transposition or by inversion followed by transposition.

   An example is the equivalence of sets [0,3,7] and [0,4,7] in the previous slide.

4. Names of sets:

Each prime form has a name of the form (cardinal number)-(ordinal number), e.g. 5-31, meaning that there are 5 elements in the set, and the set is no. 31 in the list in Appendix 1 to Forte's book.

So 3-11, the name of set [0,3,7], means that it contains 3 pitch classes and it is no. 11 in the list of 3-element sets in that Appendix.

5. **Interval vectors:**

There are 12 intervals in the octave, and these reduce by inversion to 6 *interval classes* ("ics", analogous to "pcs"); the *interval vector* of a set measures the occurrences in it of the six interval classes, in order ([occurrences of ic1-occurrences of ic2 ... ic6]), noted in the form [abcdef], e.g. [102111] – square brackets and no commas between the numerals.

Appendix 1 of Forte's book lists these for each prime form as well.

"Z-related sets" are sets sharing identical interval vectors but otherwise different. So 6Z-12 (set [0,1,2,4,6,7]), for example, shares the interval vector [332232] with the set 6-Z41 (set [0,1,2,3,6,8]).

6. **Subsets and supersets:**

B is a subset of A if every element of B is an element of A; then A is a superset of B; if set A = set B, then the elements they have in common make a subset C (the intersection of A and B), and its elements are *invariant pcs.*

7. Similarity relations:

There are *similarity relations* between sets in which *some* but *not all* pcs and ics within sets correspond.

8. Order relations:

Order relations between sets reflect the amount of rearrangement that is reflected from one set to another.

9. Complements of pc sets:

If M comprises *x* elements and N the (12-*x*) elements not in M, then M and N are complements with respect to the "universal" set of all 12 pcs within the octave; Appendix 1 in Forte's book only lists sets up to cardinal 6, regarding complements as equivalent.

10. Segmentation:

Segmentation, always a central problem in analysis, is here as elsewhere the division of pieces into segments capable of analysis along these lines. Here, it will reflect such surface items as simultaneities and rhythmically distinct figures.

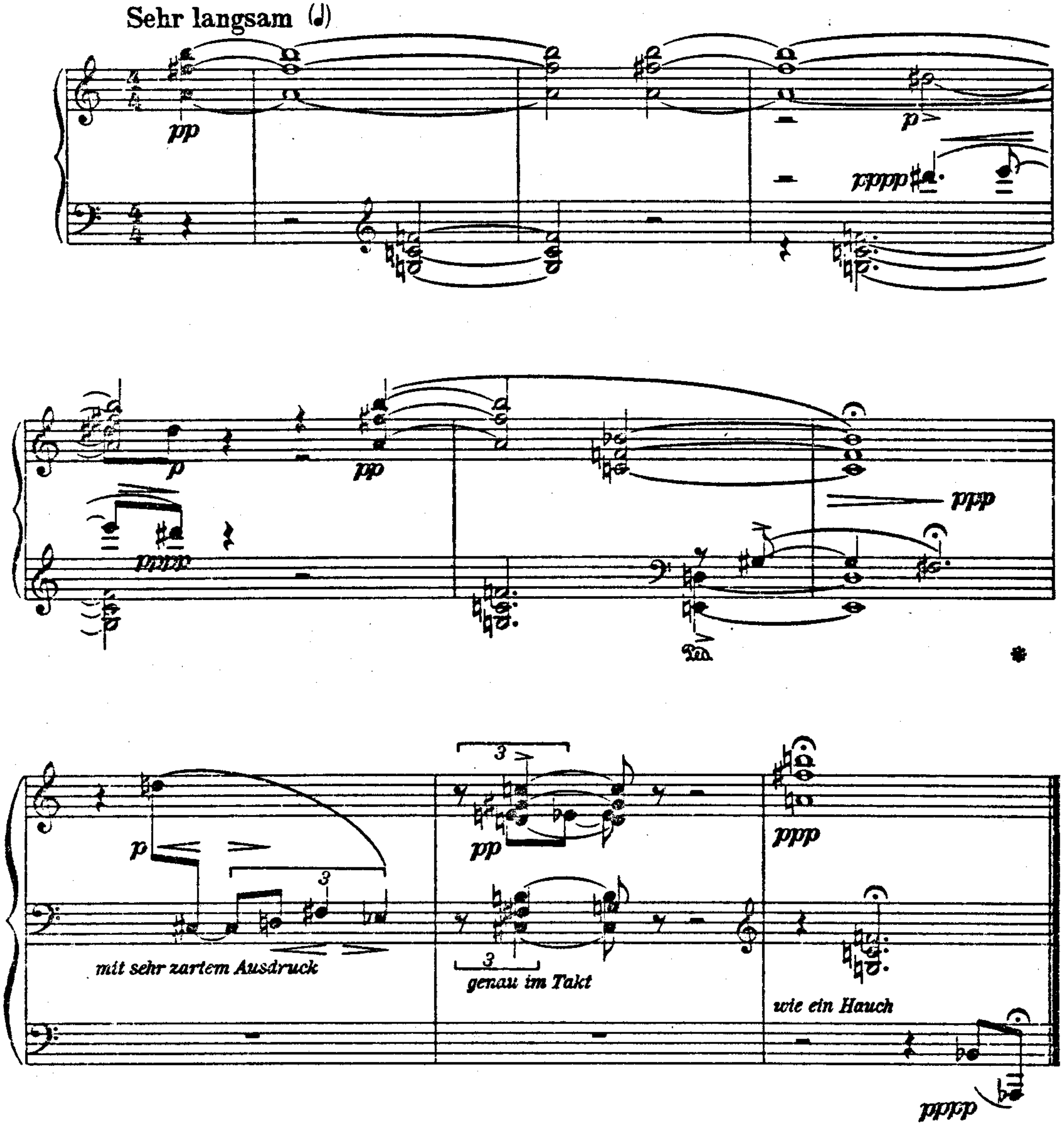
11. The set complexes K and Kh:

If S is a subset of T, then the complement of T is a subset of the complement of S, and S or its complement is a member of the **set complex K** involving T and its complement.

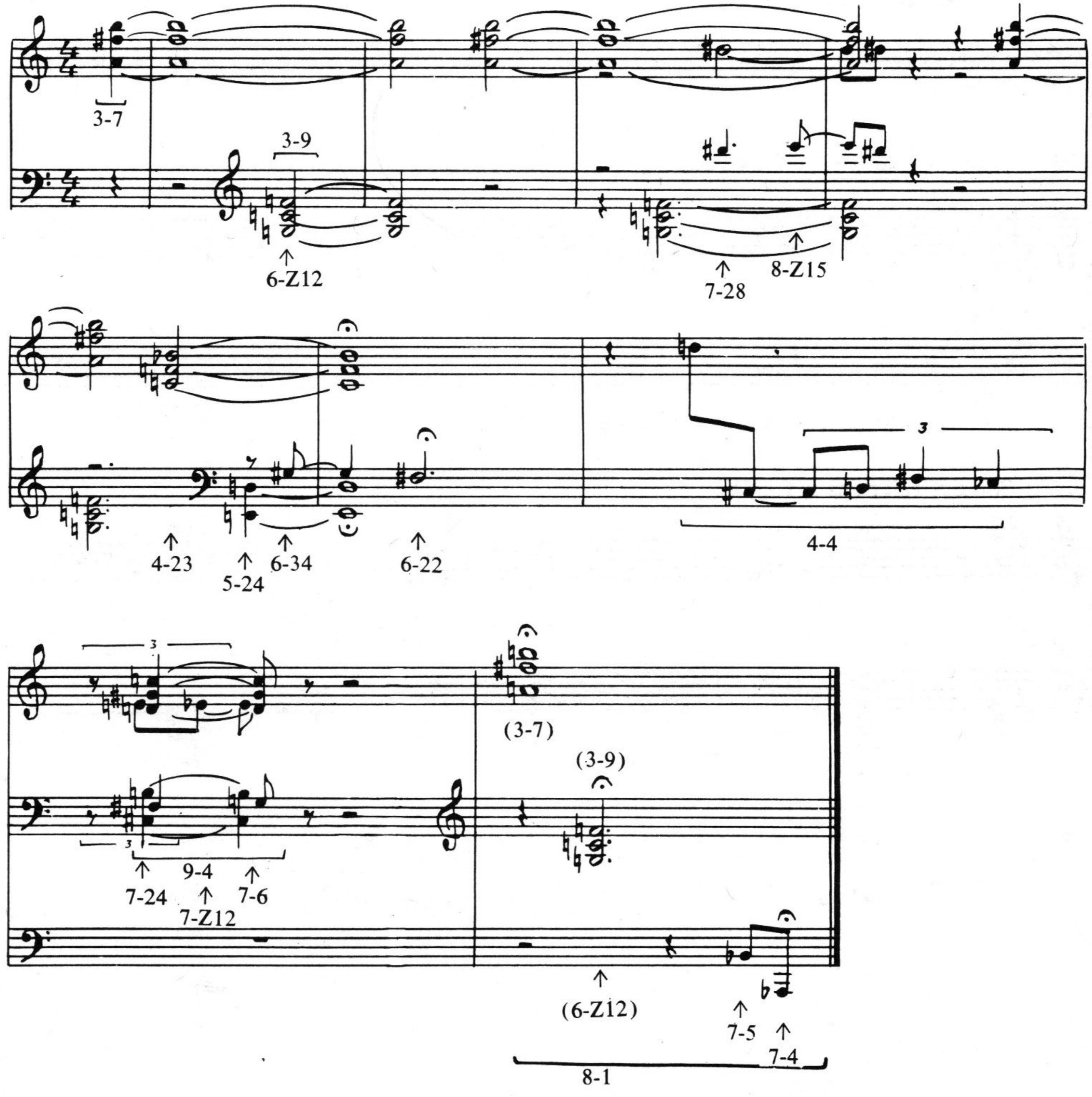
Such complexes are often too large to be useful, and so are reduced to the **set complex Kh.** "S or its complement is a member of the Kh complex about T and its complement, if and only if S can contain T or be contained in it, *and* S can contain the complement of T or be contained in it."

Appendix 3 in Forte's book lists Kh relationships. They can be looked up as a general measure of the closeness of relationship between any two sets.

Forte's book takes Schoenberg's piano piece op. 19 no. 6 as its model for analysis:



First the piece is segmented, with each combination of pitches (melodic or harmonic) identified as one of these pc-sets.



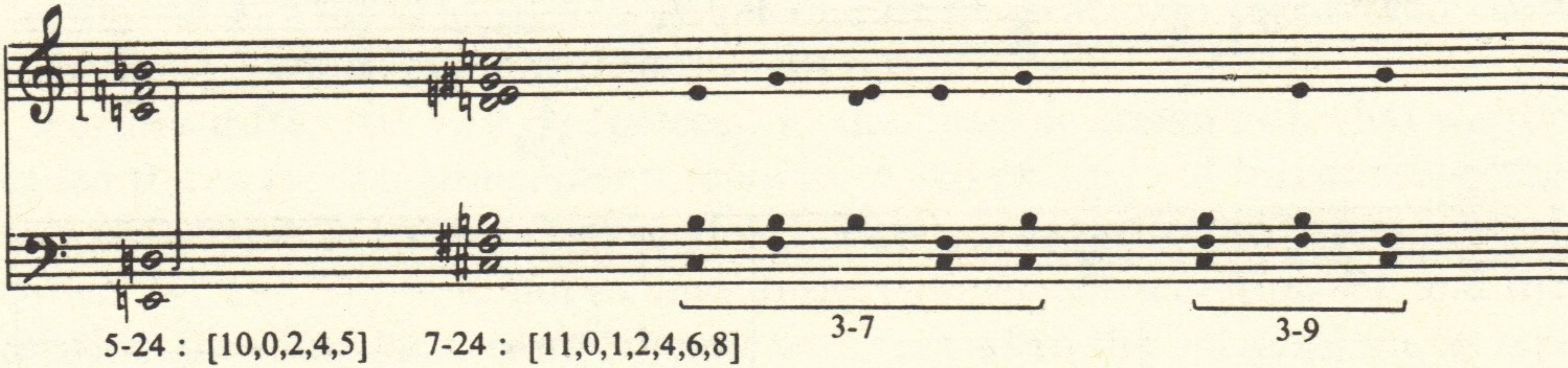
Next the potential relations between constituent sets can be tabulated, as a preliminary to judging how far they are realized.

101. Schoenberg, Six Short Piano Pieces Op. 19/6
Set-complex relations

	9-4	3-7	3-9	8-1	4-4	8-Z15	4-23	7-4	7-5	7-6	7-Z12	7-24	7-28
8-1	K	K	K										
4-4	Kh	Kh	K										
8-Z15	K	Kh	K										
4-23	K	Kh	Kh										
7-4	Kh	Kh	K	Kh	Kh	K							
7-5	Kh	K	Kh	Kh	K	K	K						
7-6	Kh	Kh	K	K	Kh	Kh							
7-Z12	Kh	Kh	K	K	K	K	K						
7-24	Kh	Kh	Kh	K	K	K	K						
7-28	K	Kh	K			Kh							
6-Z12	Kh	Kh	Kh	K*	K	Kh	K	K*	K*		K	K	K*
6-22	Kh	Kh	Kh			Kh						Kh	
6-34	Kh	Kh	Kh			Kh						Kh	Kh

* The asterisk attached to K indicates that the inclusion relation holds. This is used in case of a single Z-type hexachord.

102. Pc sets 3-7 and 3-9 in 5-24 and 7-24



Some K relations of 6 - Z12