BAIN MUSC 525
Post-Tonal Theory

Straus Chapter 2
Pitch-Class Sets

Joseph N. Straus, *Introduction to Post-Tonal Theory*, 4th ed. (New York: Norton, 2016), pp. 43-71.

"***Pitch-class sets*** are the basic building blocks of much post-tonal music.
A pitch-class set is an *unordered collection of pitch classes*…a motive from which many
of the identifying characteristics—register, rhythm, order—have been boiled away."

– Joseph N. Straus, *Introduction to Post-Tonal Theory*

TERMS & CONCEPTS

Pitch-Class Set

Pitch-class set, abbr. *pc set*

Set notation:
- Staff notation
- Letter notation
- Integer notation
  ex. (B, G♯, G) or (11, 8, 7)

Set type under cardinality
Trichord, tetrachord, pentachord, hexachord, etc.[1]

Normal Form

The most compact way to notate a pc set

Normal form algorithm
- Brinkman method (p. 45)
- Rahn algorithm

STRAUS NOTATION
ex. [G, G♯, B] or [7, 8, 11]

Clockface Diagram

A geometric model for pc space

Polygon notation
- Inscribed polygon
- Successive-interval array
- Cyclic interval array of the prime form (CINT)

Transposition

Pitch transposition

Pitch-class transposition (T_n)
- If $T_n(x) = y$, then $y = x + n$, where x & y are pitch classes and n is the transposition number
- Algebraic notation: $T_n(A) = B$, where A & B are pc sets
- Geometric analogy for T_n
- Inverse operation: T_{12-n}

Inversion

Pitch inversion

Pitch-class inversion (I)
- If $I(x) = y$, $y = 12 - x$ (mod 12)

T_nI, I, I_n & I^x_y
- If $I_n(x) = y$, then $y = n - x$, where x & y are pitch classes and the index of inversion is the sum: $n = x + y$
- Geometric analogies for inversion
- I_n is its own inverse operation

Set Class

A family, or class, of (usually 24) pc sets related by T_n/I_n

Set class, abbr. *sc*
- under T_n/I_n

Prime Form

A name for the set class that begins with 0 and is most packed to the left

Prime form algorithm
- Brinkman method (p. 67)
- Rahn algorithm
  - Short-cut method

STRAUS NOTATION
ex. (014)

Set Class List

List of Set Classes (pp. 378-81)

Forte name

Set class name
- TE substitution:[2] T=10 & E=11

Set class membership
- Distinct forms[3]

SET CLASS NAME
ex. (014), sc(014), 3-3, or 3-3 (014)

Transformational Network

A network of relationships that model musical motion

Nodes represent objects

Arrows represent operations

Isographic networks

STRAUS NOTATION

	PC set	Normal form	Forte name	Prime form	Set class	IC Vector
Letter	(B♭, A, C, B)	[A, B♭, B, C]	4-1	(0123)	4-1 (0123)	321000
Integer	(10, 9, 0, 11)	[9, 10, 11, 0]				

References

Forte, Allen. 1973. *The Structure of Atonal Music.* New Haven: Yale University Press.
Rahn, John. 1980. *Basic Atonal Theory*. New York: Longman.
Schuijer, Michiel. 2008. *Analyzing Atonal Music: Pitch-Class Set Theory and Its Contexts*. Rochester: University of Rochester Press.

[1] Rahn (1980) defines the following *set types* under cardinality: 0-*null set*, 1-*monad*, 2-*dyad*, 3-*trichord*, 4-*tetrachord*, 5-*pentachord*, 6-*hexachord*, 7-*septachord*, 8-*octachord*, 9-*nonachord*, 10-*decachord*, 11-*undecachord*, and 12-*aggregate*.
[2] AB substitution (where A=10 & B=11) is another common substitution scheme.
[3] Set classes with fewer than 24 distinct forms are said to be *symmetrical*. This will be discussed in Ch. 3.