

## Composition: Electronic Media I

Sept. 19, 2007

### Fritts Distributive Method of Transposition

1. Pitch change processing and pitch sets.
  - a. Software pitch change compared to pitch-class transposition mod 12.
  - b. David Lewin's Transformational Theory
  - c. Fritts Distributive Method of Transposition

2. Notation.
  - a. t and e for ten and eleven
  - b.  $2(0\ 1\ 4) = 2+0, 2+1, 2+4 = 2\ 3\ 6$

3. Transpositions of pitch-class set (0 1 4).

$0(0\ 1\ 4)$	=	0	1	4
$1(0\ 1\ 4)$	=	1	2	5
$2(0\ 1\ 4)$	=	2	3	6
$3(0\ 1\ 4)$	=	3	4	7
$4(0\ 1\ 4)$	=	4	5	8
$5(0\ 1\ 4)$	=	5	6	9
$6(0\ 1\ 4)$	=	6	7	t
$7(0\ 1\ 4)$	=	7	8	e
$8(0\ 1\ 4)$	=	8	9	0
$9(0\ 1\ 4)$	=	9	t	1
$t(0\ 1\ 4)$	=	t	e	2
$e(0\ 1\ 4)$	=	e	0	3

4. Set theory notation.
  - a. Set union:  $\cup$
  - b. Set intersection:  $\cap$
  - c. Empty set:  $\emptyset$
5. Set theory definitions using set  $X = \{a, b, c\}$  and set  $Y = \{d, e, f\}$ .
  - a. Set union:  $X \cup Y = \{a, b, c, d, e, f\}$
  - b. Set intersection:  $X \cap Y = \emptyset$
6. Set theory and hexachordal combinatoriality.
  - a.  $0(0\ 1\ 2\ 3\ 4\ 5) \cup 6(0\ 1\ 2\ 3\ 4\ 5) = \text{Aggregate (12-note chromatic collection)}$
  - b.  $0(0\ 1\ 2\ 3\ 4\ 5) \cap 6(0\ 1\ 2\ 3\ 4\ 5) = \emptyset$
  - c. Combinatoriality and counterpoint
  - d. Combinatoriality and harmonic areas.
7. For hexachord A, tetrachord B, and trichord C, and a transposition value  $T_t$ , consider the following
  - a. If  $T_0(A) \cup T_n(A) = \text{aggregate}$ , then  $T_0(A) \cap T_n(A) = \emptyset$
  - b. If  $T_0(B) \cup T_m(B) \cup T_n(B) = \text{aggregate}$ , then  $T_0(B) \cap T_m(B) = T_0(B) \cap T_n(B) = T_m(B) \cap T_n(B) = \emptyset$
  - c. If  $T_0(C) \cup T_m(B) \cup T_n(B) \cup T_p(B) = \text{aggregate}$ , then  $T_0(C) \cup T_m(B) \dots \cup T_p(B) = \emptyset$

8. Examples of trichord combinatoriality induced by transpositions of pitch-class set (0 1 4).

0(0 1 4)	=	0 1 4		<b>0 1 4</b>
1(0 1 4)	=			<b>1 2 5</b>
2(0 1 4)	=	2 3 6		
3(0 1 4)	=			<b>3 4 7</b>
4(0 1 4)	=			<b>4 5 8</b>
5(0 1 4)	=	5 6 9		
6(0 1 4)	=	6 7 t		
7(0 1 4)	=	7 8 e		
8(0 1 4)	=			<b>8 9 0</b>
9(0 1 4)	=			<b>9 t 1</b>
t(0 1 4)	=	t e 2		
e(0 1 4)	=			<b>e 0 3</b>

- a. Trichords on the left have the relation  $T_0(C) \cap T_x(B) = \emptyset$
- b. Trichords on the right have the relation  $T_0(C) \cap T_x(B) \neq \emptyset$

9. Application of the Fritts Distributive Method of Transposition.

- a. Goal is to transpose (0 1 4) so that 1 occurs once per trichord.
- b. This is achieved by applying two levels of transposition to (0 1 4), shown below:

$$0((0 1 4), 1(0 1 4), 9(0 1 4)), 9(0(0 1 4), 1(0 1 4), 9(0 1 4)), 1(0(0 1 4), 1(0 1 4), 9(0 1 4))$$

$$= 0 1 4 1 2 5 9 t 1 9 t 1 0 1 4 1 2 5 1 2 5 9 t 1 0 1 4$$