## **Tone-row music and serialism**

## Integral serialist composers:

- Karlheinz Stockhausen
- ı Pierre Boulez
- ı Luigi Nono
- Luciano Berio
- 1 Luigi Dalapicolla

and others. These were the same generation who first adopted this method of composing. The festival and summer courses at **Darmstadt** have continued since the beginning of the 50s and were for a long time the focal point of contemporary and avant-garde music.

The *Domain* technique of Boulez. Used in *Le marteau sans maitre* and other subsequent pieces, the domain technique involves a tone-row:

E> - F - D - C# - B> - B - A - C - G# - E - G - F#

which is divided into unequal segments of 2, 4, 2, 1, and 3 sounds:

[E>, F]; [D, C#, B>, B]; [A, C]; [G#]; [E, G, F#]

The numbers representing the groupings are permutated:

4	2	1	3	I
2	1	3	2	II
1	3	2	4	III
3	2	4	3	IV
2	4	3	1	V
	4 2 1 3 2	<ol> <li>4</li> <li>2</li> <li>1</li> <li>3</li> <li>3</li> <li>2</li> <li>4</li> </ol>	$\begin{array}{cccc} 4 & 2 & 1 \\ 2 & 1 & 3 \\ 1 & 3 & 2 \\ 3 & 2 & 4 \\ 2 & 4 & 3 \end{array}$	4       2       1       3         2       1       3       2         1       3       2       4         3       2       4       3         2       4       3       1

Each permutation generates a "**domain**" by *multiplying* these chords and intervals with each other. The *multiplication* may be understood as transposing one chord on each of the notes of another. If we notate, for example, the chords of domain I with

a [E>, F]
b [D, C#, B>, B]
c [A, C]
d [G#]
e [E, G, F#]

and *multiply* them, we obtain a matrix of the form:

aa	ab	ac	ad	ae
ba	bb	bc	bd	be
са	cb	CC	cd	ce
da	db	dc	dd	de
ea	eb	ec	ed	ee

where a consists of the interval  $E^>$  - F transposed on  $E^>$  and F, i.e. the chord:  $E^>$ , F, D $^>$ ; ab will consist of the same minor seventh interval ( $E^>$  - F) built or transposed on each sound of the second chord (D, C#, B $^>$ , B), i.e. the chord: D, C, C#, B, B $^>$ , A $^>$ , (B), A; etc.

Boulez observes that elements ab and ba contain exatly the same sounds and so do ca=ac, de=ed, etc. He calls these **total isomorphisms**. **Partial isomorphisms** are created by all the sounds in the same row or in the same column since they all have one element in common. The diagonal: aa, bb, cc, dd, ee is made of **unique** elements. The composer organizes then the music as a play between these similar, partially similar, and unique groupings.

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