Hochschule
für Musik und Theater
Hannover

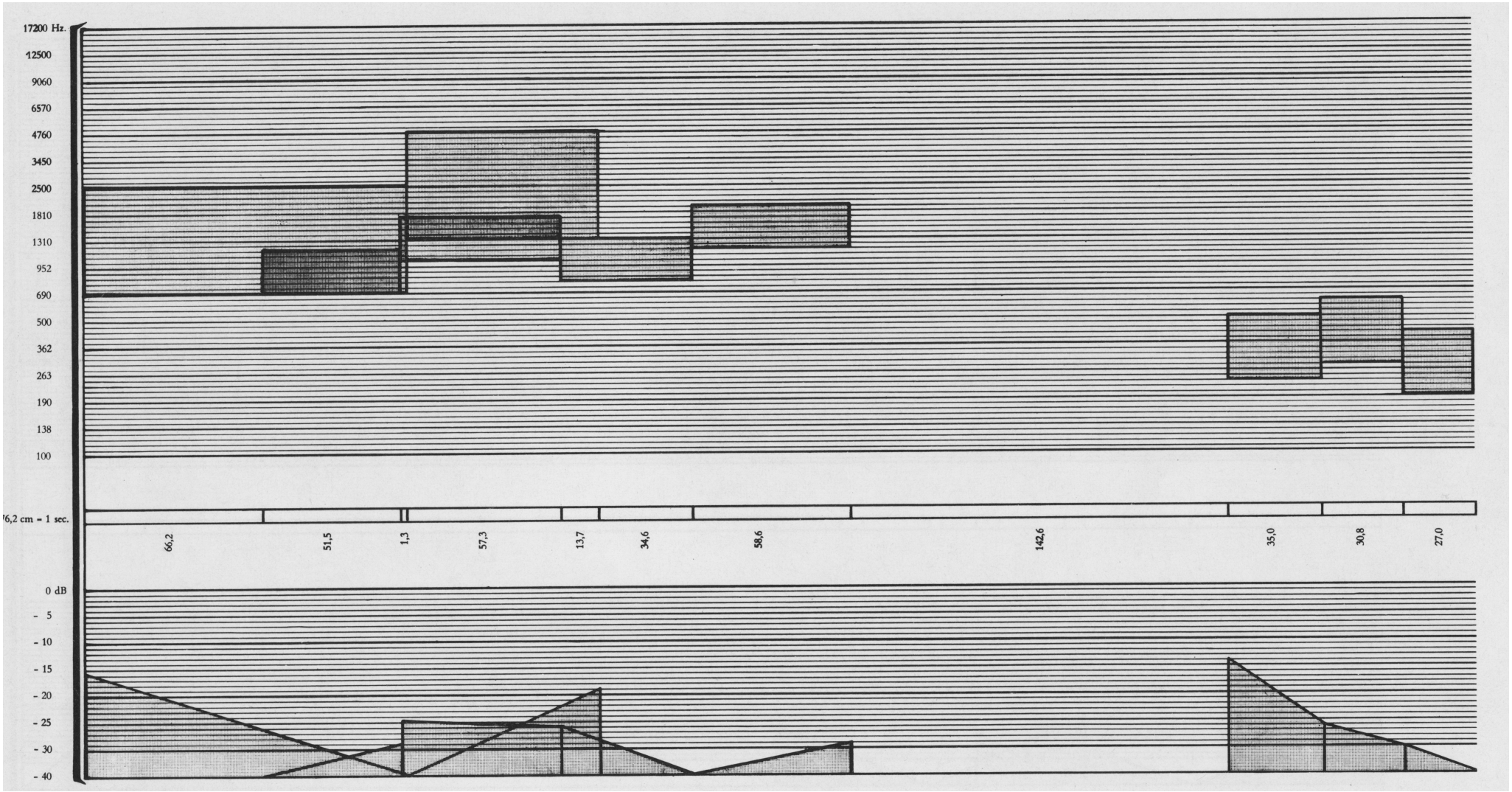
Incontri
Institut für neue Musik

Joachim Heintz

Re-Generating Stockhausen's *Studie II* in Csound

Outline

- About Stockhausen's „Studie II“
- What does Re-Generation of it mean
- Why this Re-Generation
- Show it in practice
- Problems of the Re-Generation
- What can be learned by it
- Future improvements



Stockhausen Studie II Beginning of Score

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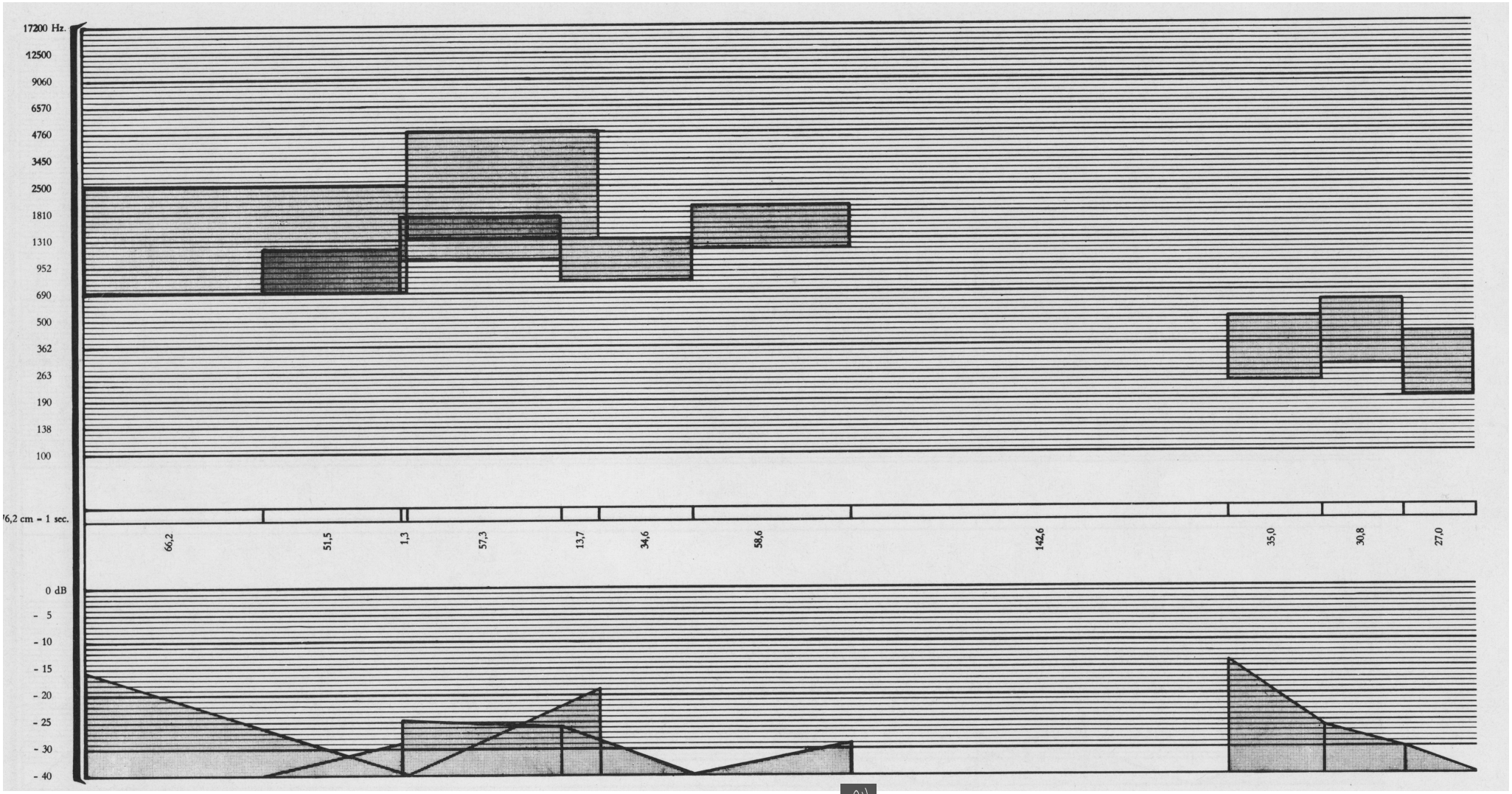

Stockhausen Studie II Beginning of Score

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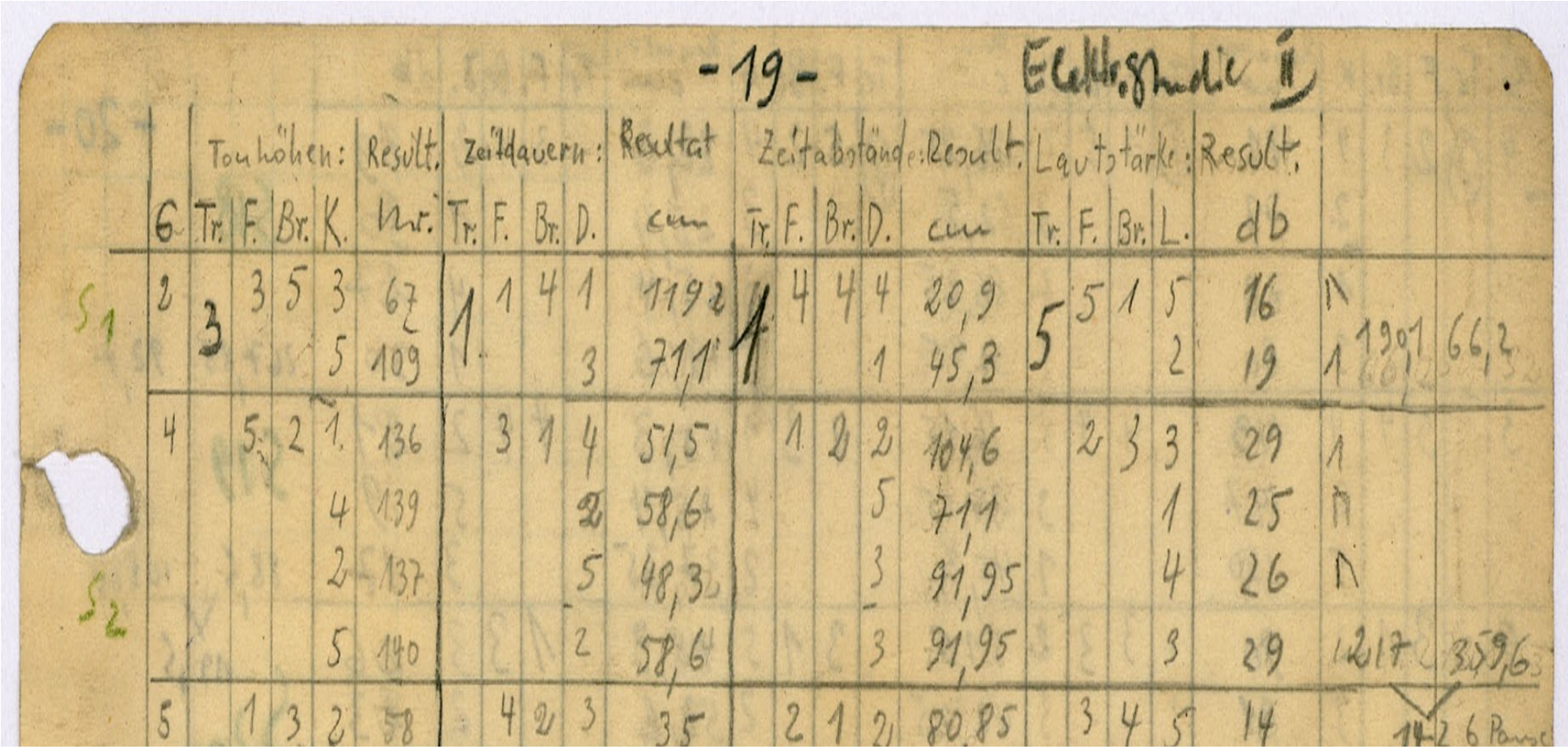
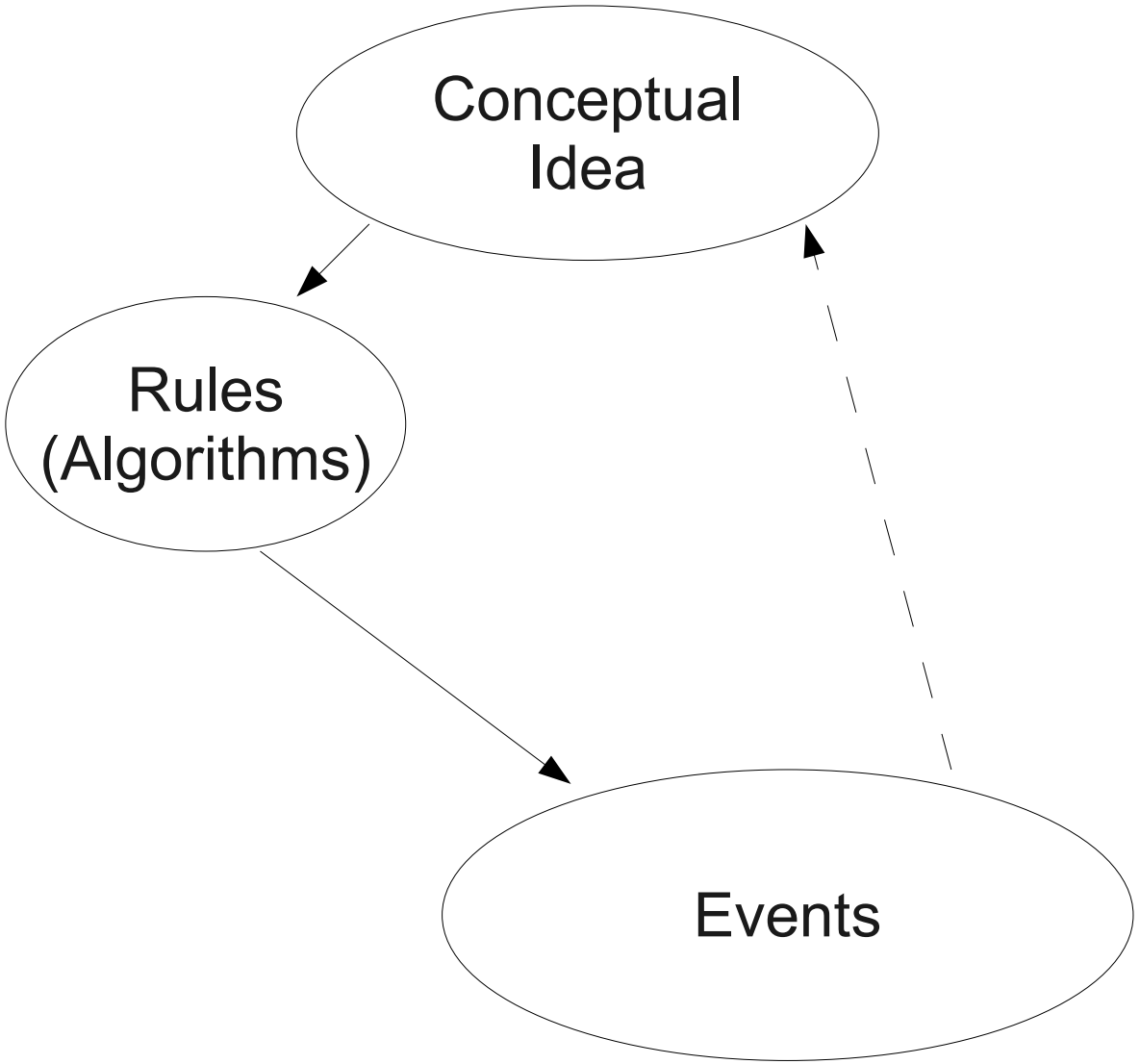
What re-generation means

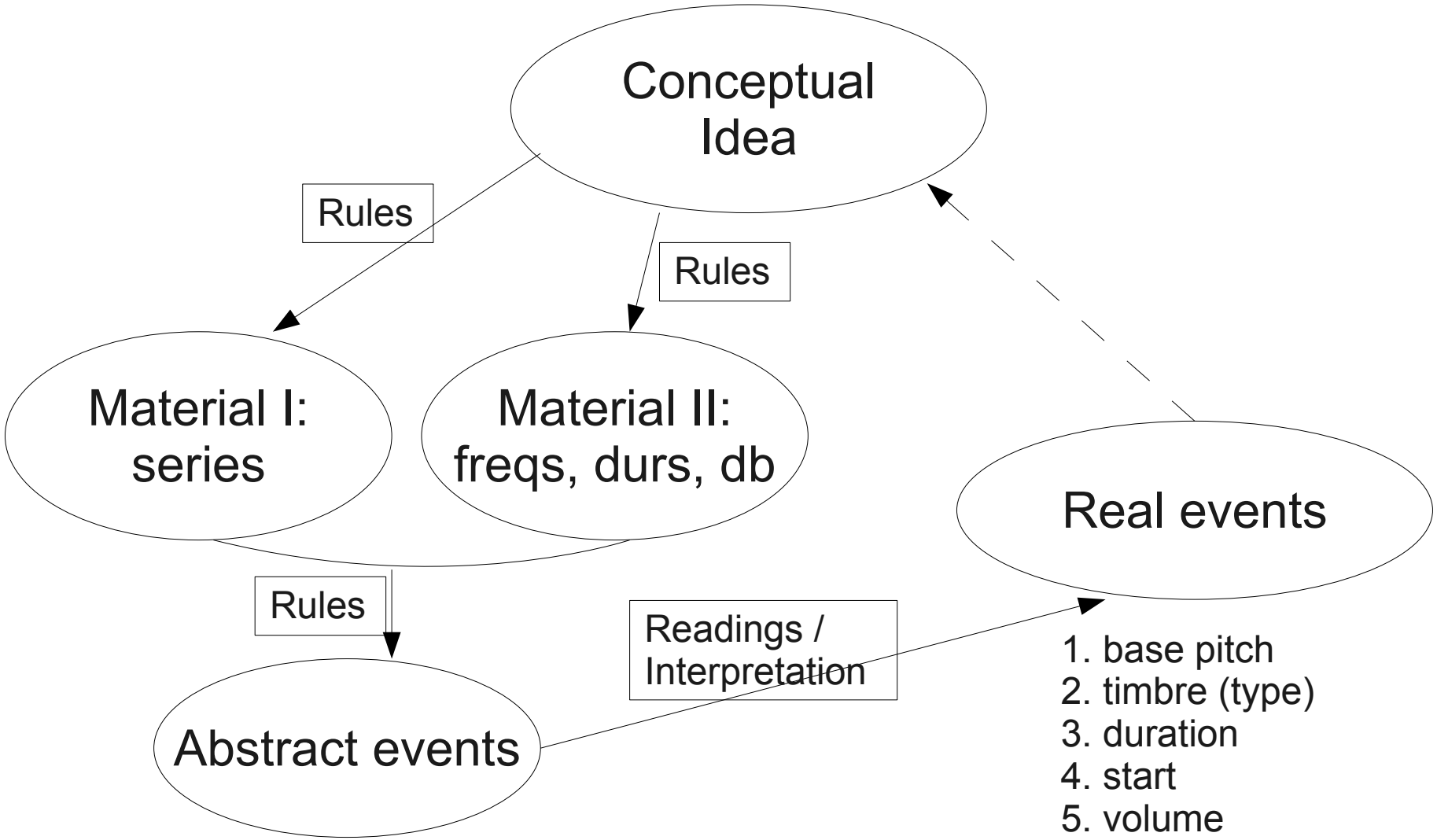


Stockhausen working sheet for the beginning of Studie II (top)
© Archiv der Stockhausen-Stiftung für Musik, Kürten (www.stockhausen.org)

Simplified model for a programmable ('algorithmic') composition

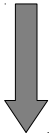


Base model for the (re-) generation of Studie II



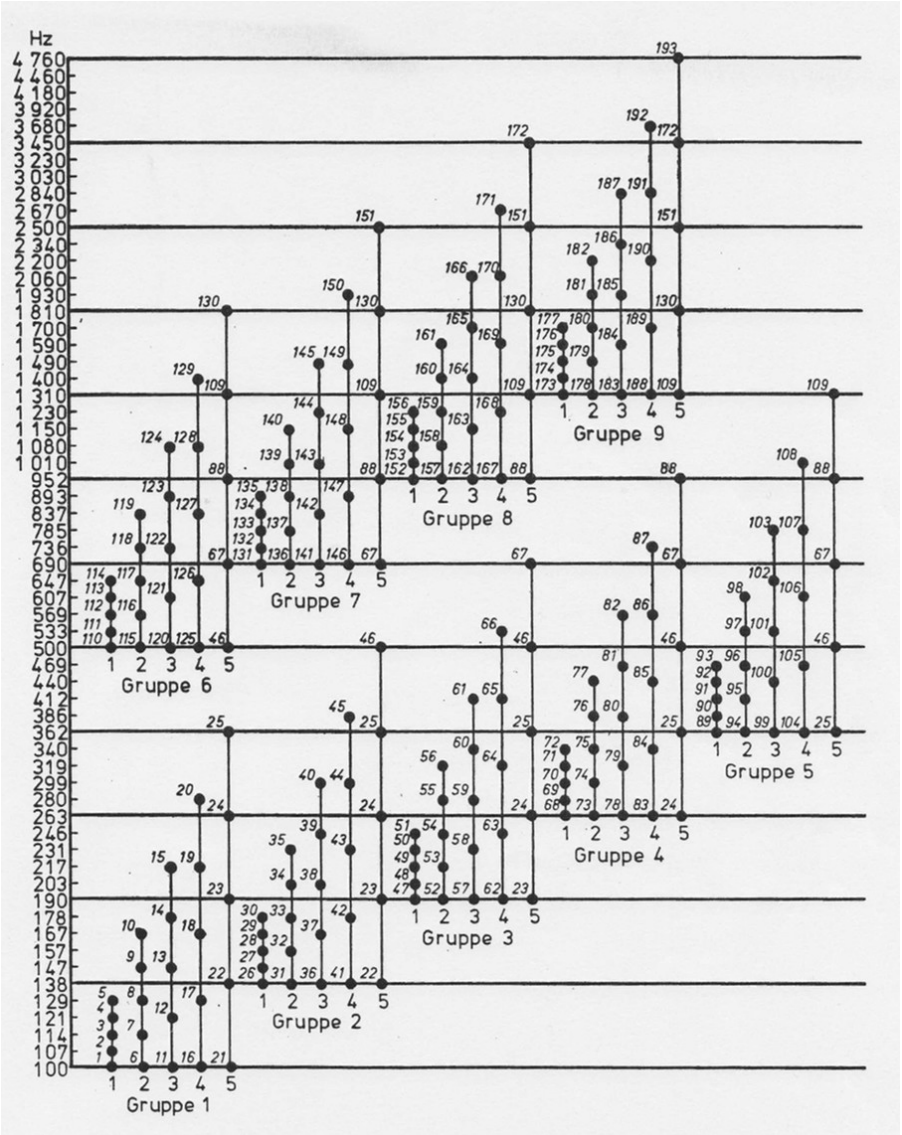
Material I: series / number squares

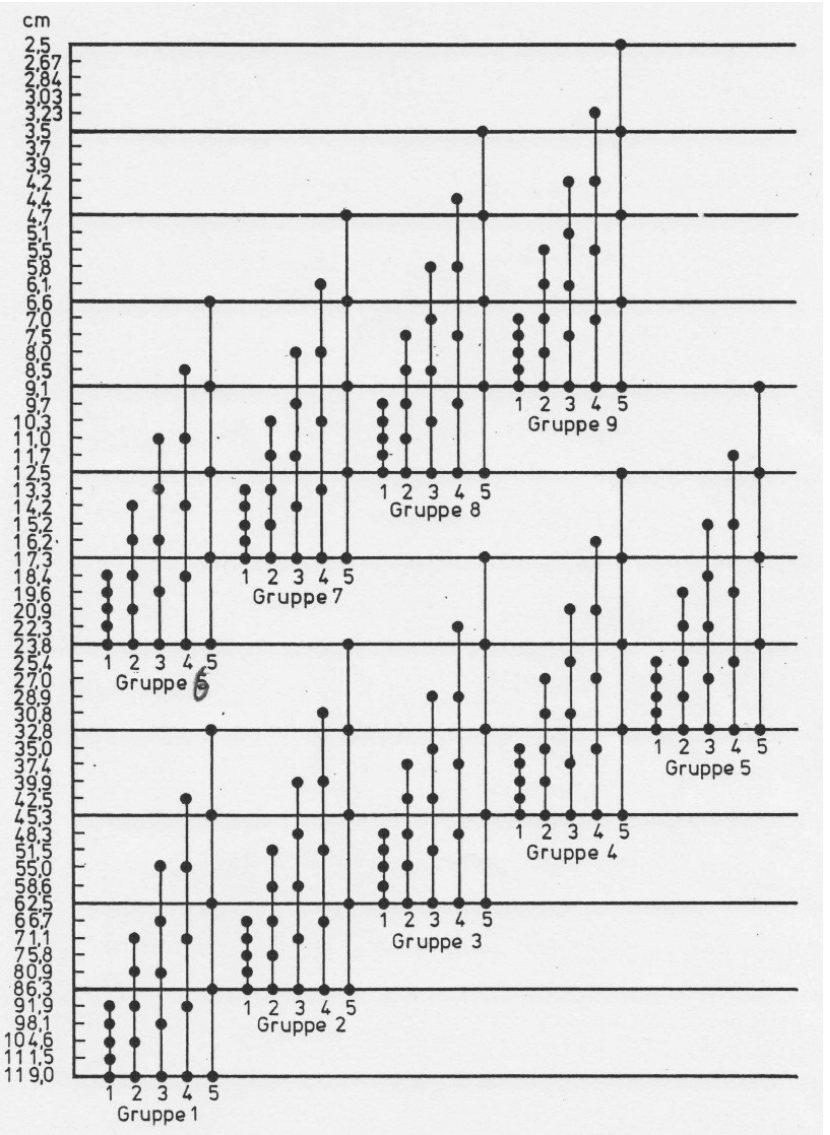
3 5 1 4 2

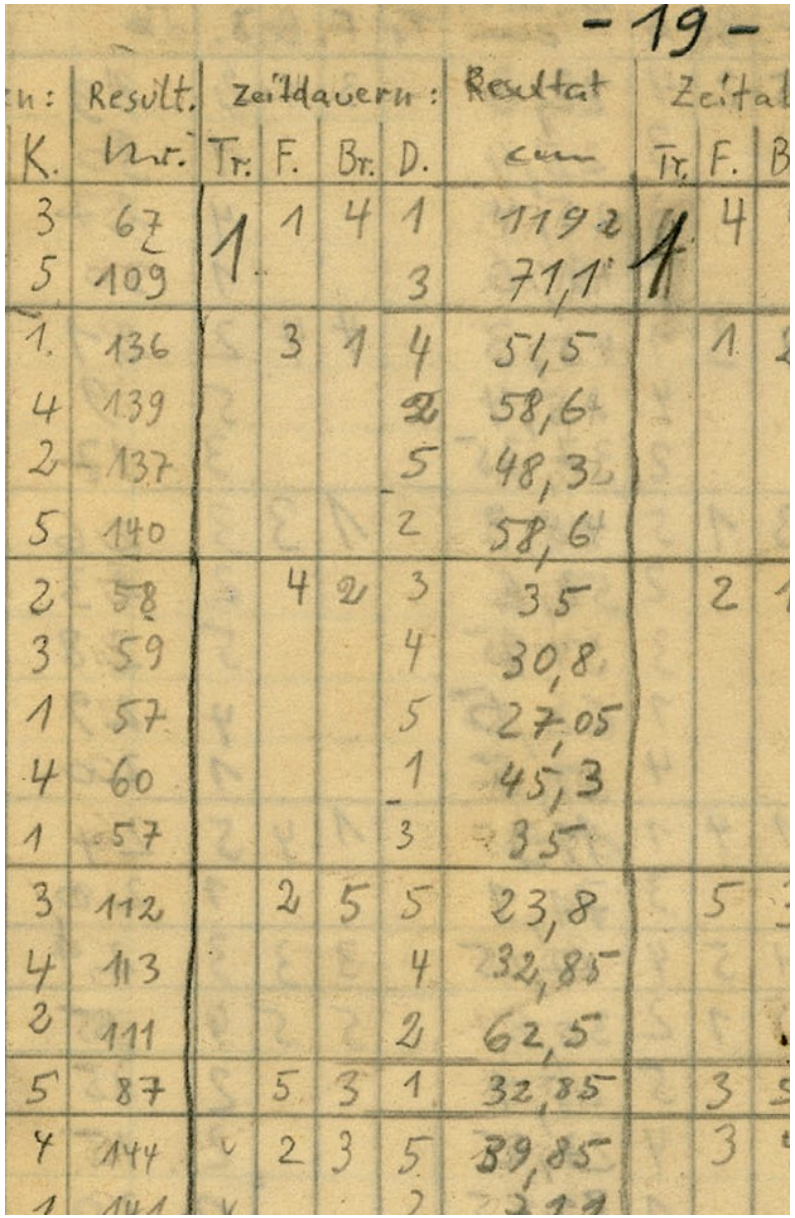


3 5 1 4 2	5 2 3 1 4	1 3 4 2 5	4 1 2 5 3	2 4 5 3 1
5 2 3 1 4	3 5 2 1 4	2 3 4 5 1	3 2 5 4 1	2 3 1 4 5
1 3 4 2 5	4 3 5 2 1	3 5 4 2 1	5 1 3 4 2	2 3 4 5 1
4 1 2 5 3	2 5 3 4 1	5 2 1 4 3	2 1 5 4 3	2 1 4 3 5
2 4 5 3 1	1 3 5 4 2	4 3 5 2 1	1 4 5 2 3	2 1 5 4 3
3 1 5 2 4	1 4 3 5 2	5 3 2 4 1	2 5 4 1 3	4 2 1 3 5
1 4 3 5 2	3 1 4 5 2	4 3 2 1 5	3 4 1 2 5	4 3 5 2 1
5 3 2 4 1	2 3 1 4 5	3 1 2 4 5	1 5 3 2 4	4 3 2 1 5
2 5 4 1 3	4 1 3 2 5	1 4 5 2 3	4 5 1 2 3	4 5 2 3 1
4 2 1 3 5	5 3 1 2 4	2 3 1 4 5	5 2 1 4 3	4 5 1 2 3

Material II: tables for possible frequencies, durations, intensities







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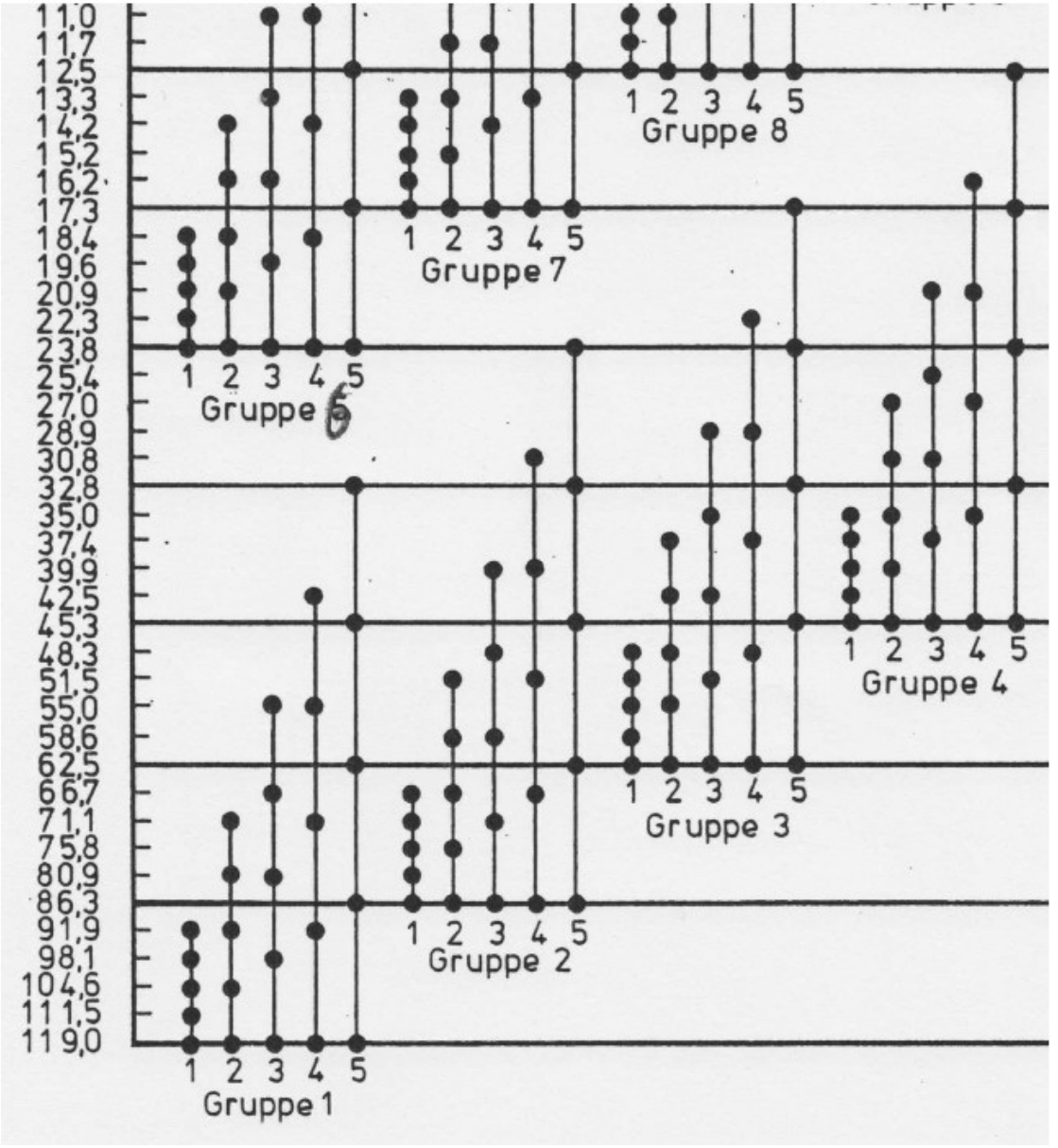
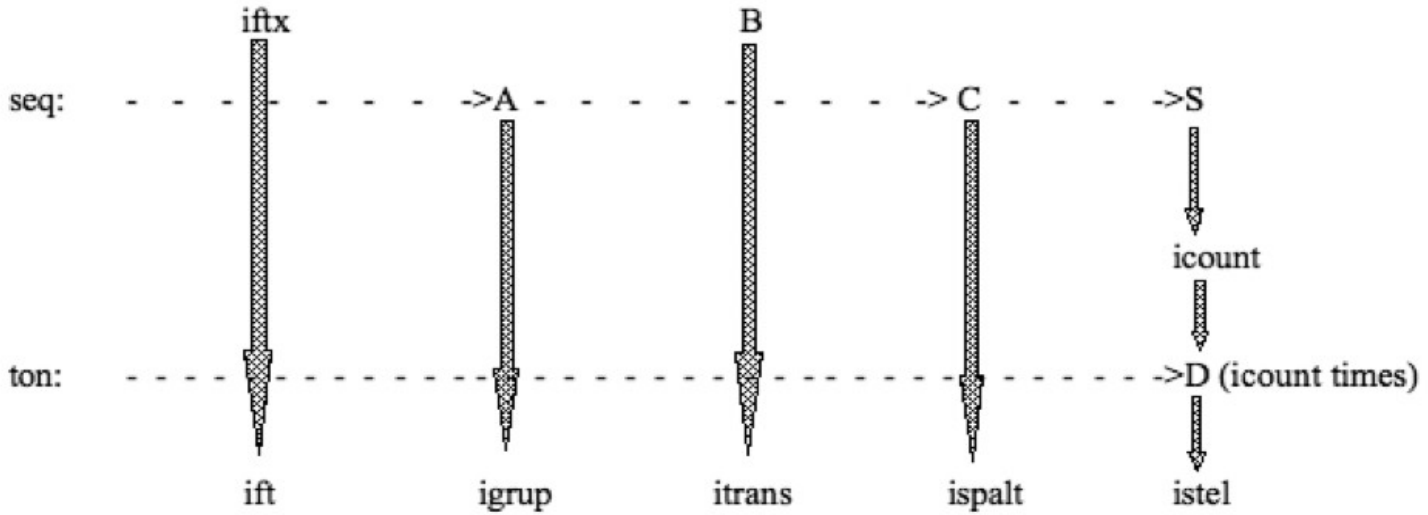
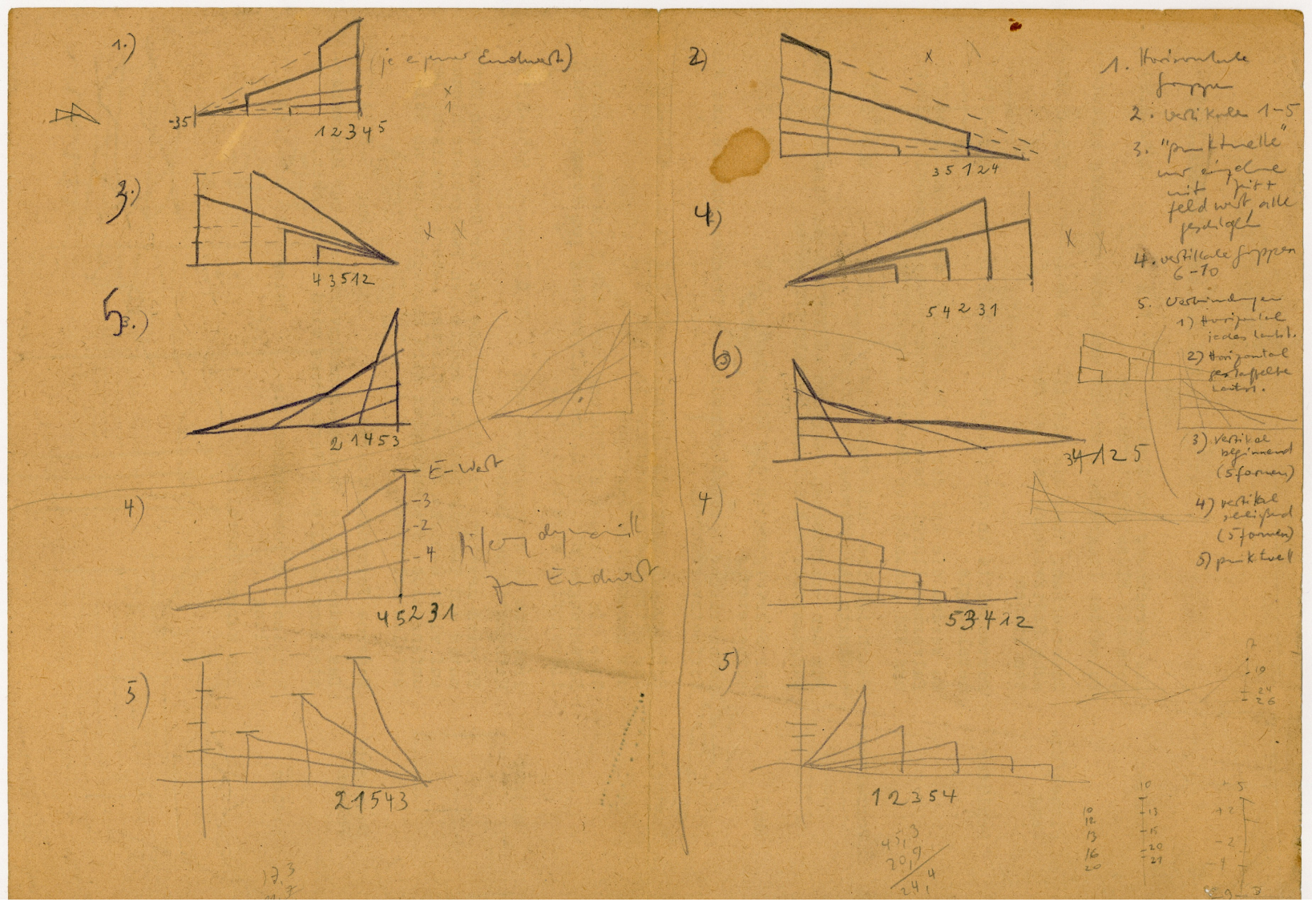
n: K.	Result. Nr.	Zeitdauern: Tr.	F.	Br.	D.	Resultat cm	Zeital Tr.	F.	B
3	67	1	1	4	1	1192	1	4	
5	109				3	71,1			
1	136		3	1	4	51,5		1	
4	139				2	58,6			
2	137				5	48,3			
5	140				2	58,6			
2	58		4	2	3	35		2	
3	59				4	30,8			
1	57				5	27,05			
4	60				1	45,3			
1	57				3	35			
3	112		2	5	5	23,8		5	
4	113				4	32,85			
2	111				2	62,5			
5	87		5	3	1	32,85		3	
4	144		2	3	5	89,85		3	





In Csound Code:

```
indxcount     =                 0
indxtonabs    =                 0
seq:
icount        tab_i             indxcount, iftcount
igrup         tab_i             indxcount, iftgrup
ispalt        tab_i             indxcount, iftspalt
indxton       =                 0
ton:
istel         tab_i             indxtonabs, iftstel
ival          SS2_ValsAusGTSS   iftbas, igrup, itrans, ispalt, istel
              tabw_i            ival, indxtonabs, iftout
indxtonabs    =                 indxtonabs + 1
              loop_lt           indxton, 1, icount, ton
              loop_lt           indxcount, 1, ftlen(iftcount), seq
```

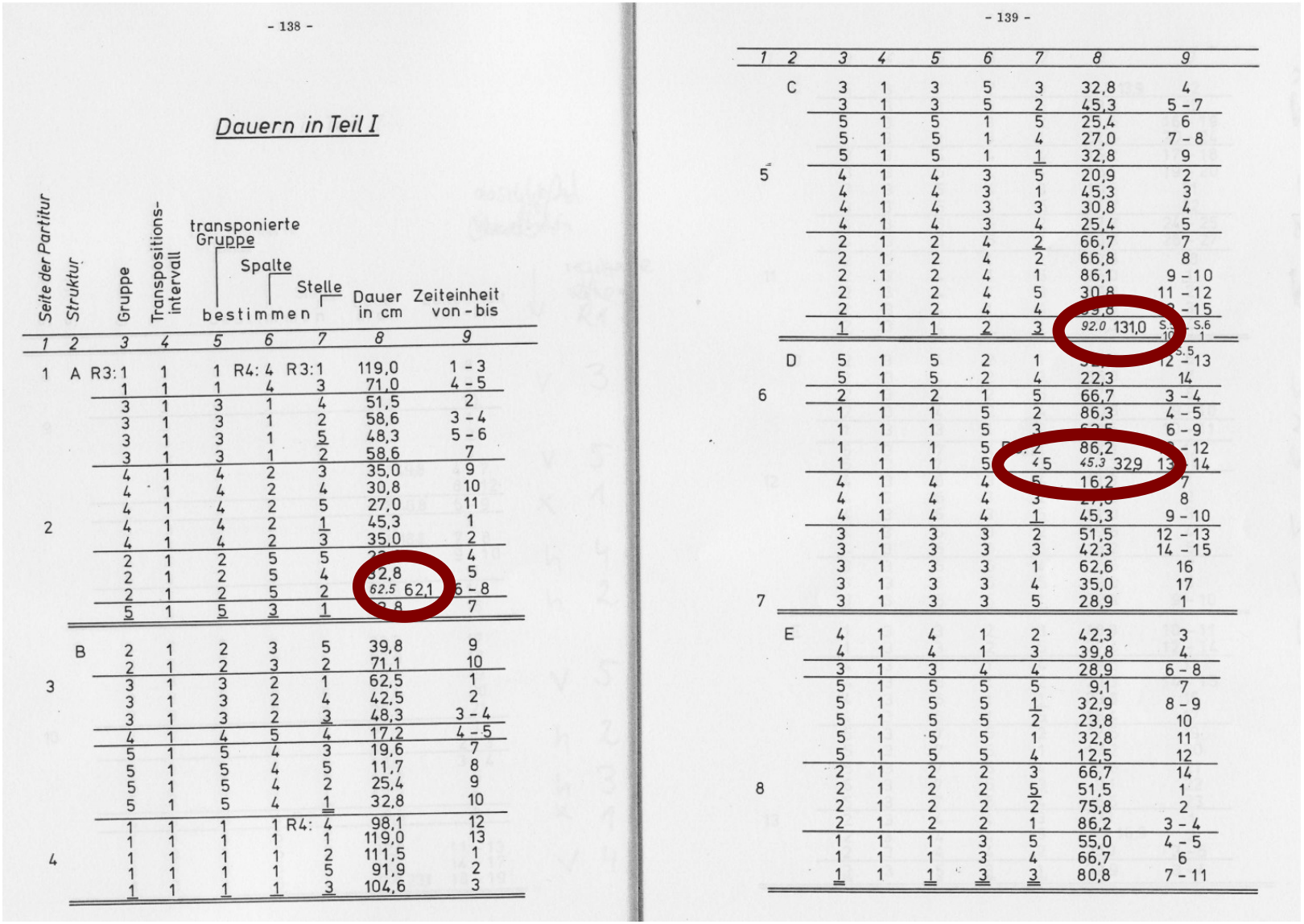


Stockhausen early sketch for envelopes. © Archiv der Stockhausen Stiftung

Small errors („Versehen“)

listed in the work of Heinz Silberhorn

(Die Reihentechnik in Stockhausens Studie II, 1980)



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Dauern in Teil I

Seite der Partitur	Struktur	Gruppe	Transpositions-intervall	transponierte Gruppe	Spalte	Stelle	Dauer in cm	Zeiteinheit von - bis
1	2	3	4	5	6	7	8	9
1	A	R3: 1	1	1	R4: 4	R3: 1	119,0	1 - 3
		1	1	1	4	3	71,0	4 - 5
		3	1	3	1	4	51,5	2
		3	1	3	1	2	58,6	3 - 4
		3	1	3	1	5	48,3	5 - 6
		3	1	3	1	2	58,6	7
		4	1	4	2	3	35,0	9
		4	1	4	2	4	30,8	10
		4	1	4	2	5	27,0	11
2		4	1	4	2	1	45,3	1
		4	1	4	2	3	35,0	2
		2	1	2	5	5	[illegible]	4
		2	1	2	5	4	32,8	5
		2	1	2	5	2	62,5 62,1	6 - 8
		5	1	5	3	1	[illegible]	7
	B	2	1	2	3	5	39,8	9
		2	1	2	3	2	71,1	10
3		3	1	3	2	1	62,5	1
		3	1	3	2	4	42,5	2
		3	1	3	2	3	48,3	3 - 4
		4	1	4	5	4	17,2	4 - 5
		5	1	5	4	3	19,6	7
		5	1	5	4	5	11,7	8
		5	1	5	4	2	25,4	9
		5	1	5	4	1	32,8	10
		1	1	1	1	R4: 4	98,1	12
		1	1	1	1	1	119,0	13
4		1	1	1	1	2	111,5	1
		1	1	1	1	5	91,9	2
		1	1	1	1	3	104,6	3

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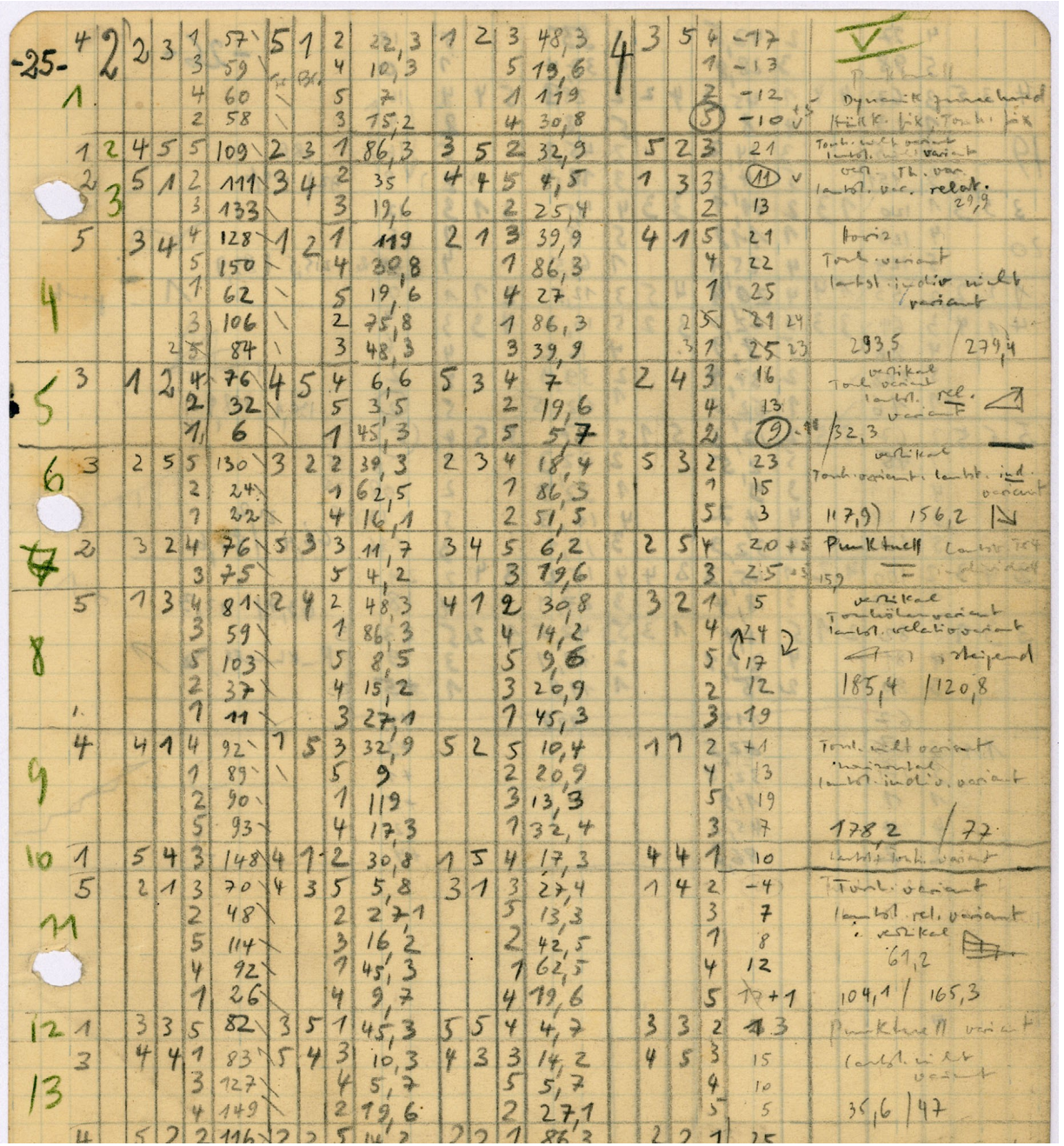
1	2	3	4	5	6	7	8	9
	C	3	1	3	5	3	32,8	4
		3	1	3	5	2	45,3	5 - 7
		5	1	5	1	5	25,4	6
		5	1	5	1	4	27,0	7 - 8
		5	1	5	1	1	32,8	9
5		4	1	4	3	5	20,9	2
		4	1	4	3	1	45,3	3
		4	1	4	3	3	30,8	4
		4	1	4	3	4	25,4	5
		2	1	2	4	2	66,7	7
		2	1	2	4	2	66,8	8
		2	1	2	4	1	86,1	9 - 10
		2	1	2	4	5	30,8	11 - 12
		2	1	2	4	4	[illegible]	[illegible] - 15
		1	1	1	2	3	92,0 131,0	S.3 S.6
	D	5	1	5	2	1	[illegible]	S.5 12 - 13
		5	1	5	2	4	22,3	14
6		2	1	2	1	5	66,7	3 - 4
		1	1	1	5	2	86,3	4 - 5
		1	1	1	5	3	[illegible]	6 - 9
		1	1	1	5	[illegible] 2	86,2	[illegible] - 12
		1	1	1	5	5	45,3 32,9	13 14
		4	1	4	4	5	16,2	7
		4	1	4	4	3	[illegible]	8
		4	1	4	4	1	45,3	9 - 10
		3	1	3	3	2	51,5	12 - 13
		3	1	3	3	3	42,3	14 - 15
		3	1	3	3	1	62,6	16
		3	1	3	3	4	35,0	17
7		3	1	3	3	5	28,9	1
	E	4	1	4	1	2	42,3	3
		4	1	4	1	3	39,8	4
		3	1	3	4	4	28,9	6 - 8
		5	1	5	5	5	9,1	7
		5	1	5	5	1	32,9	8 - 9
		5	1	5	5	2	23,8	10
		5	1	5	5	1	32,8	11
		5	1	5	5	4	12,5	12
		2	1	2	2	3	66,7	14
8		2	1	2	2	5	51,5	1
		2	1	2	2	2	75,8	2
		2	1	2	2	1	86,2	3 - 4
		1	1	1	3	5	55,0	4 - 5
		1	1	1	3	4	66,7	6
		1	1	1	3	3	80,8	7 - 11



Stockhausen working sheet for part five of Studie II
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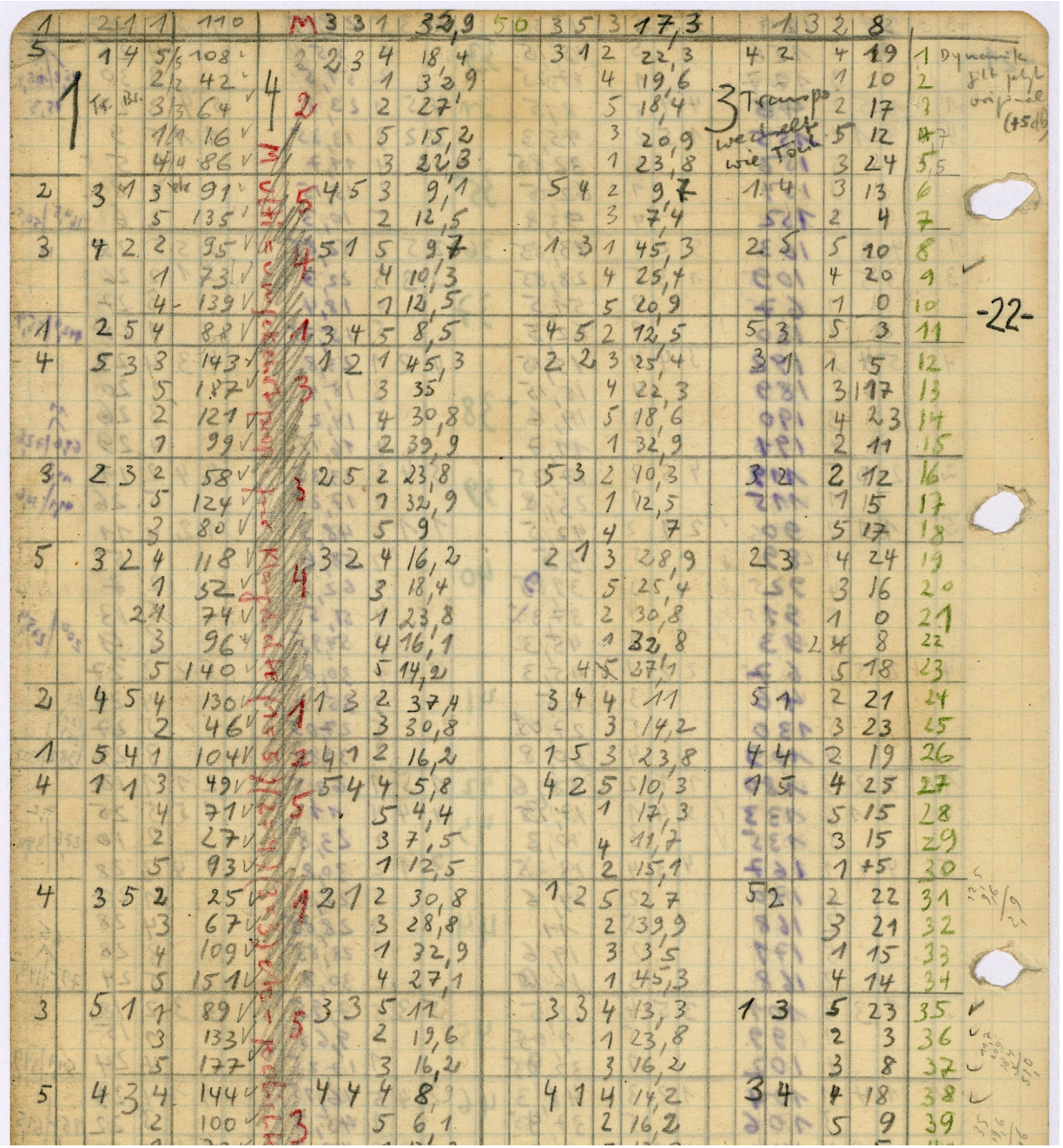

Stockhausen working sheet for part three of Studie II
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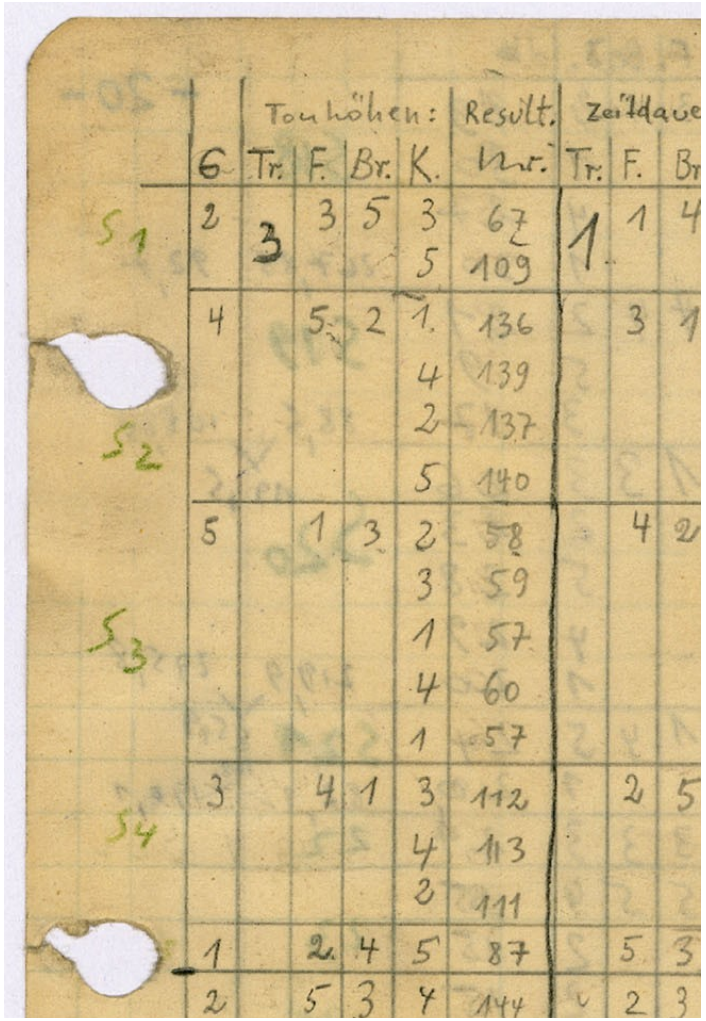
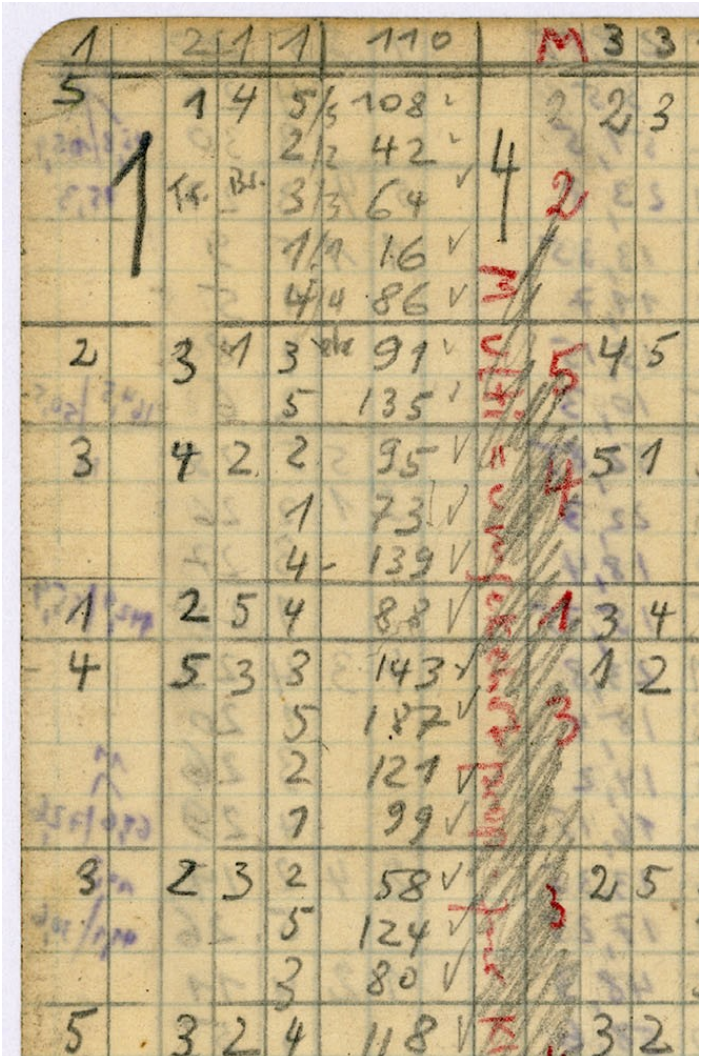
Three ways of working in Studie II

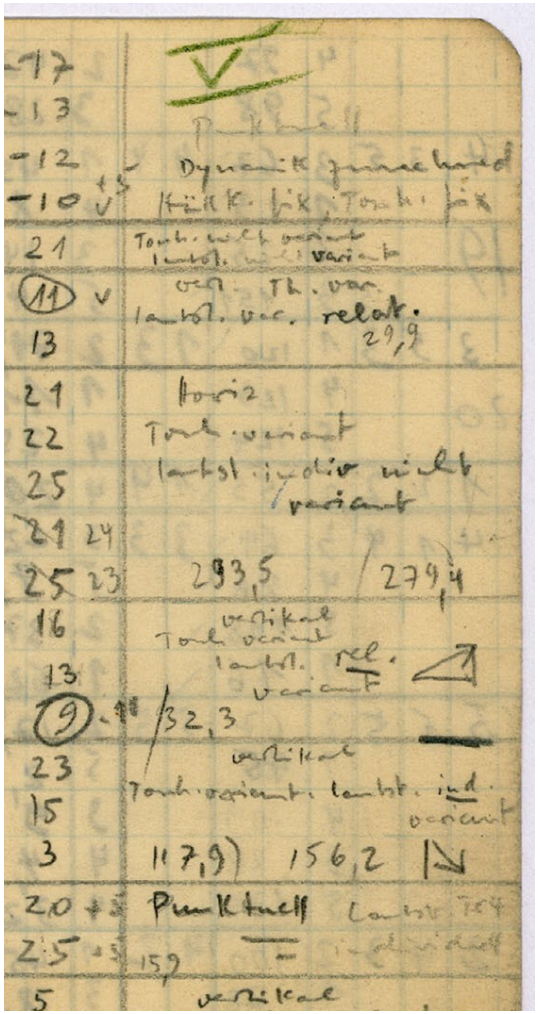
Applying the base rules (part 1)



Changing some rules, but they remain rules (part 3)



Breaking the program-mability by spontaneous decisions (part 5)



Links

QuteCsound:
http://sourceforge.net/projects/qutecsound
(Re-Generation: Examples → Music)

Version without widgets (english and german):
www.joachimheintz.de
(→ Software)