

PIANO WORK II

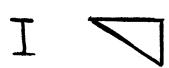
for
1 Piano
4 Hands

by
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Feb 1/90

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Available Forms I-IV



4:00'

A



4:00'

B



8:00'

A+B



8:00'

B+A

→ Piano Work II maybe performed in one of four forms.

→ Forms III + IV are to be played without pause between their combined sections.

→ The top staff of □ is to be played 8va↑ throughout.

→ The bottom staff of □ is to be played 8vb throughout.

→ Sharps and Slats apply to one note only. Naturals function as reading aids only.

→ All grace notes are to be played on the beat or on the main note and not before it.

→ A detailed analysis is given at the back.

Piano Work II

Structural Analysis

Sections, tempos, pulses

The main structure of the work is based on the formula:

$$23x^2 = 16y$$

- x is equal to the numbers 1 to 12 representing the twelve sections of and .
- the resulting y factors determine the tempo of each section
- sections are numbered 1 to 12
- sections are numbered 12 to 1

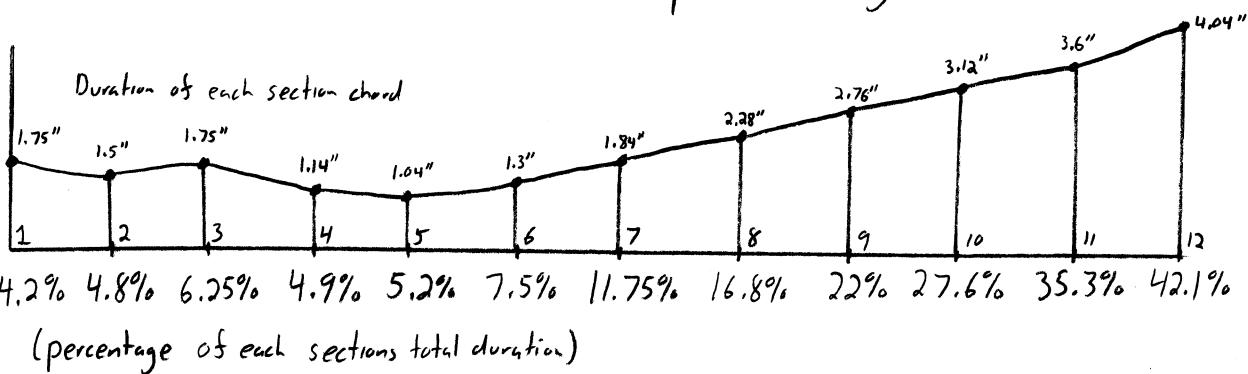
Section (X)	Tempo (Y)	1 pulse every	Pulses per section	Duration of each section	Realized
1	1.44	41.75"	1	41.75"	$\text{d} = 60 \text{ for } 41\frac{3}{4} \text{ beats}$ $\times 1 \text{ pulse}$
2	5.71	10.5"	3	31.5"	$\text{d} = 60 \text{ for } 10\frac{1}{2} \text{ beats}$ $\times 3 \text{ pulses}$
3	12.9	4.66"	6	28"	$\text{d} = 60 \text{ for } 4\frac{2}{3} \text{ beats}$ $\times 6 \text{ "}$
4	23	2.6"	9	23.4"	$\text{d} = 46 \text{ for } 2 \text{ beats}$ $\times 9 \text{ "}$
5	36	1.66"	12	19.9"	$\text{d} = 72 \text{ for } 2 \text{ beats}$ $\times 12 \text{ "}$
6	52	1.15"	15	17.25"	$\text{d} = 52 \text{ for } 1 \text{ beat}$ $\times 15 \text{ "}$
7	69	.87"	18	15.66"	$\text{d} = 69 \text{ " "}$ $\times 18 \text{ "}$
8	92	.65"	21	13.65"	$\text{d} = 92 \text{ " "}$ $\times 21 \text{ "}$
9	116	.52"	24	12.5"	$\text{d} = 116 \text{ " "}$ $\times 24 \text{ "}$
10	144	.42"	27	11.34"	$\text{d} = 144 \text{ " "}$ $\times 27 \text{ "}$
11	176	.34"	30	10.2"	$\text{d} = 176 \text{ " "}$ $\times 30 \text{ "}$
12	208	.29"	33	9.6"	$\text{d} = 208 \text{ " "}$ $\times 33 \text{ "}$
(tempos rounded off)				<u>234.75"</u>	

- it will be noticed that the duration of each section is inversely proportional to its tempo and number of pulses. e.g.
 - the longer the section the slower the tempo and the less the number of pulses.
 - the shorter the section the quicker the tempo and the greater the number of pulses.

- The long pulses (41.75", 10.5", 4.66" etc) must each be imagined to a single pulse that is slowed down to an extremely slow tempo. The notes that make up each long pulse are the minute inner workings and divisions that comprise the larger single whole. The same as a normal quarter note may be broken into sixteenths, triplets etc, so the long pulse is broken down into even finer divisions and gradations.
- Each pulse is defined by an accented chord or note. (pulse chord)

Sections 1-5 - broken 3 note chord separated by fifths
 " 6-7 - broken 2 note chord separated by a fifth
 " 8-9 - solid 2 note chord separated by a fifth
 " 10-12 - a single note

- For □, the pulse chord is found at the beginning of the bar.
- For △, the pulse chord is found at the end of the bar.
- Each section is defined by a single 5555 accented chord. (section chord)
- For □, the section chord is found at the end of the section.
- For △, the section chord is found at the beginning of the section.
- The section number determines the number of notes in the section chord.
 e.g. Section 2 = 2 note chord
 Section 7 = 7 note chord
- The section chords also adhere to a pattern that governs their duration.



- Thus a secondary pulse between active and inactive parts of each section is formed.

Pedal

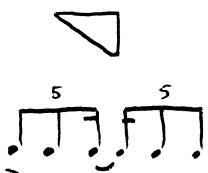
- The main purpose of the pedal is to define the individual pulse. All notes inside a pulse are sustained for the length of the pulse. In sections 8 to 12 however, some notes by remaining depressed are further held into a second pulse. In sections 6 to 12 the pedal also begins defining the secondary pulse between the active and inactive parts of each section. The inactive parts (section chords) are each defined by one [P *] even though they may contain up to 14 pulses.
- In sections 6 to 11 □ where the section chord begins in the last pulse of the active section the pedal is used to allow only the section chord to sustain into the inactive section.
- In section 6 to 11 △ the pedal, by cutting out any sympathetic vibrations, slightly changes the resonance of the section chord as it enters into the first pulse of the active part.
- The use of the pedal in the middle of section I subdivides the long pause.
- In section I □ by releasing the pedal over a period of a quarter note all previous notes and sympathetic vibrations are systematically filtered out, leaving only the depressed note (G#)
- In section I △ the resonance of all previous notes are suddenly cut and by depressing the pedal over a period of one quarter note the sympathetic vibrations of the new note (C#) are slowly introduced. This is however barely audible.

Rhythms, Densities + Density Waves

- The use of distinct rhythms is found from sections 7 to 12.
- The accented note is the pulse chord which is followed by controlled notes

The image shows handwritten musical notation for sections 7, 8, and 9. The notation uses a variety of symbols including triangles, squares, and arrows, often with numbers 1 through 12 placed above them. Measures are separated by vertical lines, and specific notes within measures are marked with arrows and superscripted numbers such as 1, 2, 3, 4, and 5. The notation represents complex rhythmic patterns and density waves as described in the accompanying text.

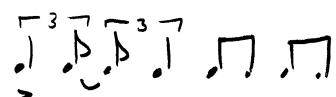
10



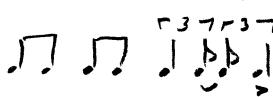
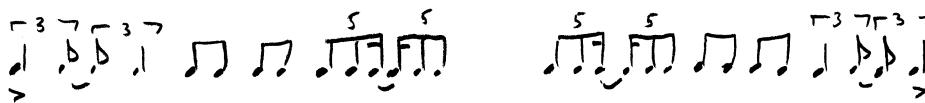
11



12a



12b



- These rhythms also have further pitch and dynamic characteristics.

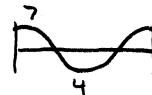
- From sections 6 to 12 density (number of notes per pulse) becomes a compositional factor.

- Section 6 □ begins with 3 notes per pulse and fluctuates for the rest of the section between 4, 5, +6 notes per pulse. Section 6 △ follows the same parameters except in reverse.

- Section 7 □ follow the format of:

6565 6554 5443 443 2 notes per pulse

Section 7 △ follows in reverse



- Section 8 □ follows the format of:

777 66 555 44 555 66 777 notes per second



- Section 9 □ follows the format of:

55 666 777 666 555 666 77



- Section 10 □ follows the format of:

666 7777777 6666666 777



- Section 11 □ follows the format of:

777 66666 77777 66666 777



- Section 12a □ follows the format of:

6776677

- The action of a uniform increase and decrease in density is known as a density wave.
- Sections 8 to 12a follow the same format in reverse although do not adhere strictly to the number of pulses per second.
- Due to overlapping every rhythmic pattern produces a certain number of controlled notes per pulse.

<u>Rhythmic pattern</u>	<u>Number of controlled notes per pulse, (including pulse chord)</u>
7	2
8	3
9	4
10	5
11	6
12a	5 (though the possibility is 7 only 5 ever occur together)
(12b	7.5)

- As the number of controlled notes increase per section the amplitude of the density wave grows narrower and narrower until in 12b the controlled notes take over allowing no possibility for a density wave to function.
- In sections 1-5 the notes are placed freely.
- In section 6 the first hints of density shaping becomes apparent.
- In section 7 the use of density shaping becomes even more pronounced.
- In sections 7-12 controlled notes appear
- In sections 8-12a density waves function.
- Besides pulse chords, section chords and controlled notes all notes and rhythms for sections 1-9 and 12a are freely placed.

- As controlled notes slowly begin to take over, the placement of free notes becomes more and more restricted.

- In sections $10 \square + 11 \square$ the rhythmic placement of the free notes becomes determined as well. This rule applies only when one or two notes are required to fulfill the number of notes required to satisfy the density wave. The free notes of the 1st bar of $\square 10$ and the 1st, 2nd and last 4 bars of $\square 11$, exceeding 2 notes, are freely placed. The notes of $12a$ are freely placed and $12b$ allows for no free notes as it consists entirely of controlled notes.

- Section $10 \square$ free notes follow the pattern:

: $\text{7.} \text{D.}$	$\overset{\text{r3}}{\text{7.1}}$	$\text{7.} \text{D.}$	$\overset{\text{r3}}{\text{3.} \text{D.}}$	$\text{7.} \text{D.}$:
- single notes	1	2	3	4	5

 - double note combinations $12, 13, 14, 15, 23, 24, 25, 34, 35, (45)$
not used

 - order they appear $1, 2, 12, 13, 14, 15, 23, 24, 25, 3, 4, 5, 1, 2, 3, 4, 34, 35$

- Section $11 \square$ free notes follow the pattern

: 7.1	$\overset{\text{r5}}{\text{7.} \text{D.}}$	$\overset{\text{r5}}{\text{7.} \text{P.}}$	$\overset{\text{r5}}{\text{3.} \text{P.}}$:
- single notes	1	2	3	4

 - double note combinations $12, 13, 14, (23, 24, 34)$
not used

 - order they appear $1, 12, 2, 3, 4, 1, 13, 14,$

- In sections $10 \square + 11 \square$ only traces of the patterns can be found.

Density Chart

<u>Section</u>	<u>notes per second (average)</u>	<u>Section</u>	<u>notes per second</u>
1	1.75	6	4
2	2.3	7	5.1
3	2.36	8	9
4	3.3	9	11.5
5	5	10	15.5
		11	19.4
		12a	22.8
		12b	26.3

[active Sections only]

Dynamics

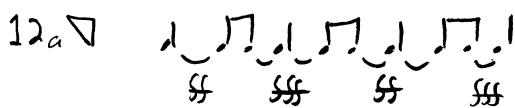
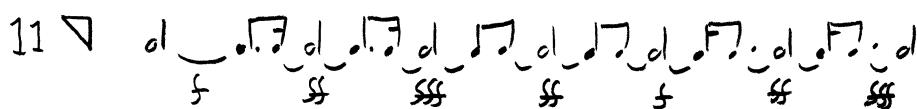
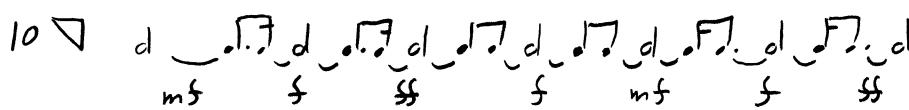
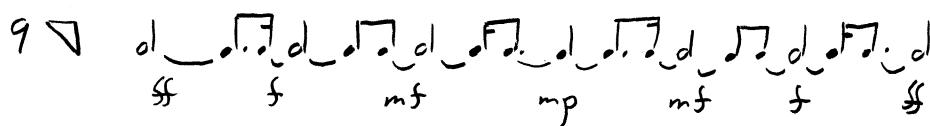
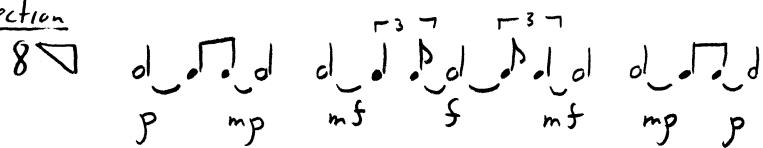
- all section chords are marked **ffff** and accented
- all pulse chords as well are accented
- the following chart shows the dynamic patterns

<u>Section</u>	<u>Pulse chord</u>	<u>Controlled notes after pulse chord</u>	<u>Quietest dynamic</u>
1-4	mf	—	ppp
5-6	ff	—	pp
7	ff	pp	pp
8	ff	p	p
9	ff	mp	mp
10	ff	mf	mf
11	fff	f	f
12a	fff	ff	ff
12b	ffff	ffff	ffff

- thus the dynamic characteristics of the pulse chord to the controlled notes is seen.

- In section 6 □ the first example of dynamic shaping is seen as the section begins pp and ends mf-f. (Section 6 △ is reversed: mf-f to pp)
- Subsequently section 7 □ moves backwards from f to pp (Section 7△ is reversed: pp to ff)
- Dynamic waves control the free notes of section 8 □ to 12a □.

Section

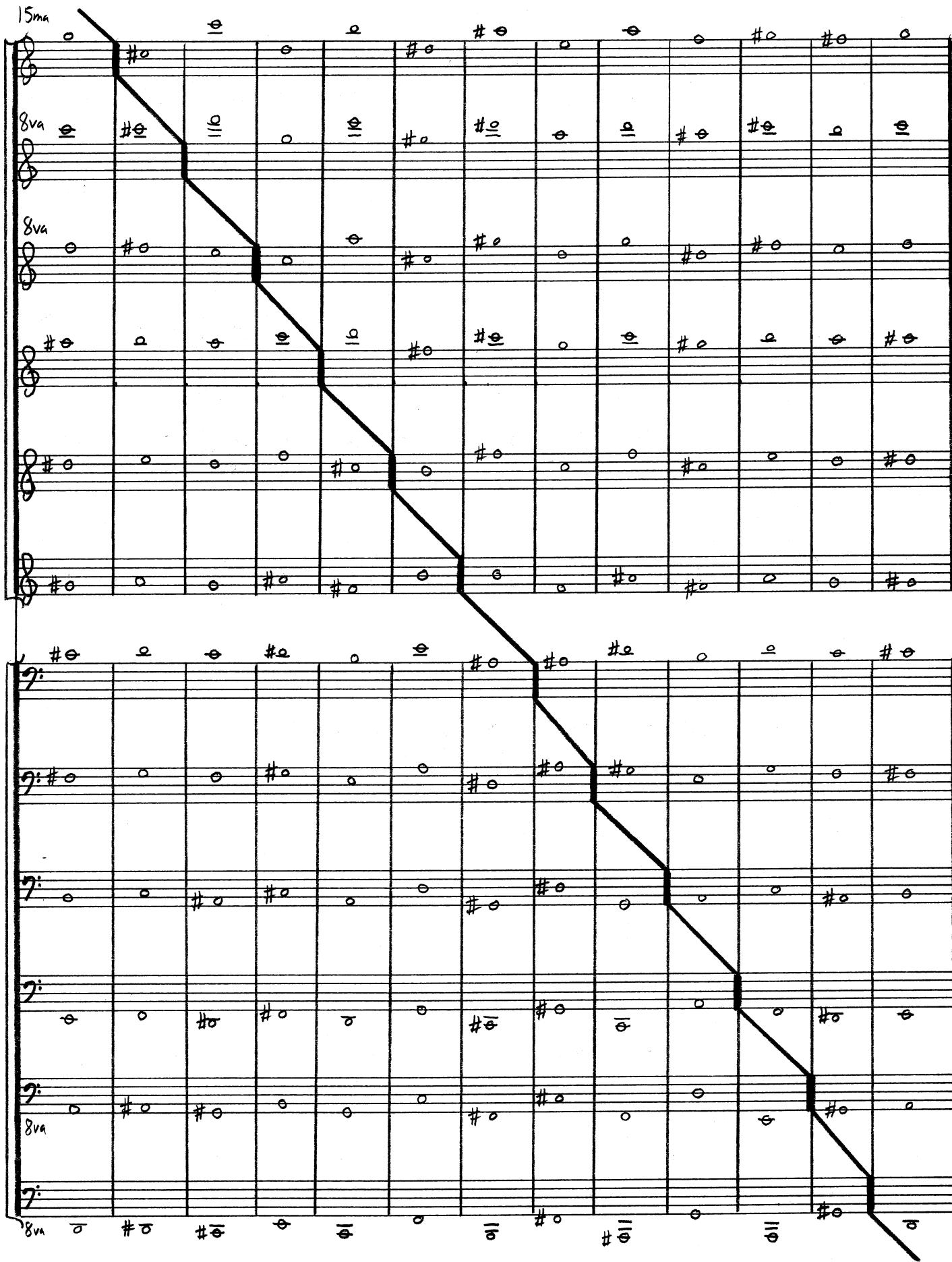


- The dynamic waves of sections 8-12 □ follow the same format but in reverse and are slightly shifted due to the shifts in the density waves of sections 8-12 △

Pitch

- the pitch patterns of the chart controls the work only to a certain degree.
- the structure of the chart is such
 - an all interval row starting on the highest G of the piano.
→ GF#G#FAEA#D#BDCG# > The two rows are invertible.
 - D D# C#E C F B F# A#GAG#
 - an all interval row starting on the lowest D of the piano.

Pitch Chart



- Of the high row: The G moves down by 5ths until all 12 notes are covered
 The F# " " " " until 11 notes are covered
 The G# " " " " " 10 " " "
 etc

- Of the low row: The D moves up by 5ths until all 12 notes are covered
 The D# " " " " 11 notes are covered
 The C# " " " " " 10 " " "
 etc

- Thus a diagonal line runs through the middle of the chart separating the two rows and their extensions.
- The two sides of the charts are perfect inversions of each other not only pitch wise but register wise as well.
- The most obvious thing the pitch chart controls is the section chords.

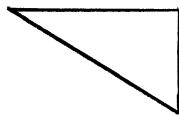
Section 1 is a single note : $\triangle C^\#$, $\triangle G^\#$
 Section 2 is 2 notes : $\triangle FC$, $\triangle AE$
 and so on up to the
 12 note chord of section 12

- Pulse chords, though they consist of 3 notes or 2 notes separated by fifths or a single note, are chosen freely but do have a structural purpose in register.
- In sections 1-5 the simple rule holds that no note can stand alone but must be connected to at least one other note on the chart that is immediately adjacent to itself. (up, down, across or diagonal thus nine possibilities)
- This rule does not apply for sections 6-12 as with the increase of notes it is almost possible to connect any note after a couple of bars.

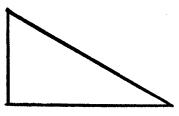
- The pitch chart as well determines the controlled notes.
- In Section 7-9 to find the controlled notes:
 - 1) if the pulse chord starts in the lower half of the pitch chart then move diagonally upward and to the left from the top note of the pulse chord to find the required controlled notes.
 - 2) if the pulse chord starts in the upper half of the pitch chart then move diagonally downward and to the right from the bottom note of the pulse chord to find the required controlled notes.
- If a pulse chord can be found in two places the controlled notes that move farthest away are chosen.
- In Sections 10-12 to find the controlled notes:
 - 1) if the pulse note is in the upper section of the pitch chart move across to the left to find the required controlled notes.
 - 2) if the pulse note is in the lower section of the pitch chart move across to the right to find the required controlled notes.
- If a pulse note can be found in two places the controlled notes that span the widest interval are chosen.
- In section 12b some controlled notes are transposed into other octaves to allow the section to be completely controlled thus being the fulfilment of sections 7 to 12a.

Register

- The register structure of the work is described by the geometric figures



→ starts in the highest register of the piano and continues until the entire range of the keyboard is covered.



→ starts with the entire range of the keyboard and continues until only the lowest register remains.

- Besides the large register structure smaller inner register workings take place as well.

They are:

Section 5 □ → the upward trend of the pulse chords

Section 5 △ → the downward trend of the pulse chords

Section 6 □ → where starting again in the top register is reminiscent of the opening of Section 1 □

Section 6 △ → where the movement to the lowest register foreshadows the ending of Section 1 △

Sections 10 □ + 11 △ → the sections open up from a narrow middle register to encompass the entire register.

Sections 10 △ + 11 □ → the section begins with the entire register and closes in towards a narrow middle register.

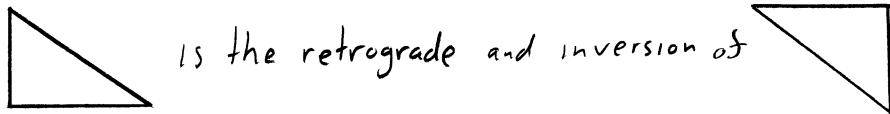
- Though the register slightly narrows in the middle of section 12 the register and intervallic structure of the pulse notes is the important feature.

Register and intervallic structure of pulse notes of 12 □ (for 12 △ reverse and invert)

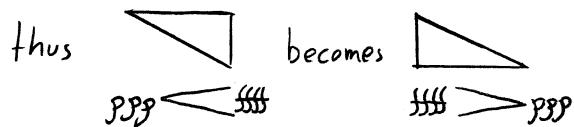
- The sequence of notes is an all interval row starting on the fourth note.

D[#] G D G[#] C[#] A C A[#] B F E F[#] | D[#] G D G[#] C[#] A C

Retrograde and Inversion



- dynamics do not invert but retrograde only,



- the sections as well only retrograde, the relationship between active and inactive sections, pulses etc remaining intact,

thus $1 \rightarrow 12$ becomes $12 \rightarrow 1$

- every pitch inverts not only pitch wise but register wise as well according to the pitch chart. Thus all register structures remain intact.
- with every pitch inverting exactly, the rhythmic characteristic of the 2 and 3 note pulse chords in retrograde remains the same.



thus the pulse chords retain their identity in both and .

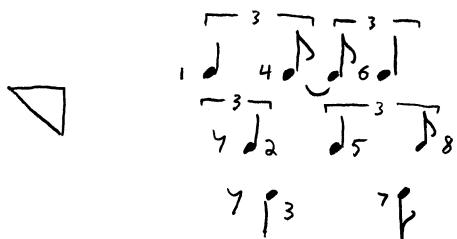
- pitch retrograde however presents a number of problems due to the following factors:

- 1) each piano note has a distinct attack and decay. Retrograde would require the note to begin softly, grow in intensity and end with an attack, the reverse of an attack/decay, which is obviously impossible.

- 2) the use of the pedal also sustains each note to the end of the pulse, so in retrograde, to have an exact harmonic retrograde the pulse would have to begin with all the notes and the notes would then have to be cut off one by one at the attack points of the original. This proves impossible because the pedal also governs each pulse of the retrograde making cut off impossible, and

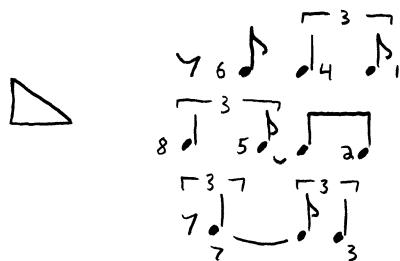
impractical because of the severe loss of rhythmic characteristics.

- As seen a true retrograde that takes in all elements of attack, envelope etc on the piano is impossible.
- A simplistic retrograde of each single bar and hoping for the best is a meager inconsistent solution.
- The most satisfying solution is a melodic or rhythmic retrograde. (termination/attack retrograde)
- an example shows best how this retrograde works



- the retrograde begins with the last played note 8Δ . In retrograde the termination point of 8Δ becomes the new attack point of 8Δ . The attack point of 8Δ becomes the new attack point of 7Δ . The attack point of 7Δ becomes the new attack point of 6Δ , and so on until the attack point of 2Δ becomes the new attack point of 1Δ .

thus:



- While this retrograde is not exact harmonically it is both rhythmically and melodically exact, as well as retaining all the harmonic tension of the original.
- Sections 12Δ to 7Δ run two different retrogrades simultaneously. The regular retrograde deals exclusively with the pulse chords and controlled notes. (refer to pages 3+4 for retrogrades of distinct rhythms). The termination/attack retrograde deals only with

the free notes. The free notes fall into units of overlapping notes. Each section is made up of many of these units, the smallest number of notes in a unit being one.

- In sections 6 Δ to 1 Δ the termination/attack retrograde only is used, the length of a unit always being one pulse.
-

If ∇ is the shore,
then Δ is its reflection in the water.

