



espacios encordados  
for feedback piano

espacios encordados / for feedback piano and digital manipulation  
(‘stringed spaces’)

The piece explores the piano as a resonant box through the experimentation of different excitatory techniques, combining its acoustic response to various frequencies and impulses in three different movements.

These movements are analogies of different imaginary spaces recreated by the internal amplification of the instrument. The sound behavior within its architecture in connection with the performer’s actions constitutes each of these, which consist of an attacked muted piano, a piano played by its own sound refractions and a piano played by a computer.

### **General indications**

#### I. Technical requirements

- The piece is to be played on a grand piano.
- No need of computer assistance is required since the computer program is designed to run only with the aid of any single switching external device (MIDI, OSC). The computer program is available upon request.
- The feedback system consists of four speakers (or any effective sound transducer) powered by a set of low voltage amplifiers and a pair of electrets miniature microphones, (more about it in movement description) although this is very easy and low cost to replicate this is available upon request to the composer.
- The piano is amplified with two microphones inside it that are routed to a stereo system. Other configurations can be explored depending on the available system
- A small light is to be placed inside the piano. This is to be on for the second and third spaces/movements while the rest of the hall remains dark. (Optional)

#### 2. Duration

The total duration of the piece is .ca 20 minutes long, however (with the exception of the first movement) all durations are suggested times as the performer is required to acquire a fair degree of familiarity with the system, which responds differently according to the physical conditions of instrument and the venue, therefore the duration of each section may vary depending of their content and instrumental responsiveness.

### 3. Score

As the piece develops mainly out of unconventional techniques of sound production, the notation of these actions is a graphical description of the main processes and sounds; nevertheless, the musical core of each section, and its performance actions, is explained in a text inside a box at the beginning of each section. Within these instructions, and the rest of the contained graphical information, the performer is expected to take the necessary freedom to undertake the musical processes, always based in his musical ear and the confidence with the system.

## Espacios

### Espacio I

No computer processes are involved. The highest octave and a half of the piano is muted with the help of a piece of thick tape or any other similar item that would mute the strings and provide a percussive sound rather than pitch. All durations are to be taken as rigorous as possible.



### Espacio II

Is to be performed entirely inside the piano, the pianist should walk next to the piano so that he/she is facing the strings. The feedback system is already set inside the piano (including miniature microphones on the wrist of the performer) and the sustain pedal should remain open for the rest of the piece. The feedback system consists of 4 speakers facing down to the surface of the piano as shown in figure 1. These speakers are to feedback with two microphones placed on each of the performers wrists. The computer controls the feedback frequency while the volume and resonance of the strings, and of the overall instrument, depends on the hand's movements, figure 2. All the internal resonances are at the same time amplified through the PA of the concert hall. With the use of an internal light the arm movements from the performer controlling the feedback, resonances and string vibrations, are emphasized, creating a 'sonic choreography'.

Figure 1. Transducers



Figure 2. Feedback System



Figure 3. Espacio II with light

### Espacio III

At the end of the previous 'space' the lid should be closed and the performer should walk in front of the computer, ideally placed on the stage opposite to the piano. The performer is to activate a series of presets on the computer program which intention is to excite different resonances and vibrations created inside of the, already closed, piano; but which sound is still controlled by the pianist (although without any contact and from a certain distance to the instrument) and projected over the concert hall.



Inside the piano (sustain pedal down)

amplification + digital manipulation

(40")

(60")

etc...

Plucked

Plucked LH

Feedback RH

switch

switch

Pluck the string progressively opening each amplifier while waving both hands, shortening the distance between loudspeakers and wrist microphones, provoking a subtle feedback arousal.

Pluck any string within the indicated range while controlling the level of feedback with the other hand



Plucked

progressively, and extremely silent, add metal objects on the strings

(2'30")

Pitch curve

Pulses

Distance between microphone and speaker

switch

Vary the distance between microphones and speakers evolving from a stable pitch continuum to an irregular and unstable chaos, by progressively shortening the distance between microphones and speakers as well as by adding light metal objects on the strings.

switch

(15') walk slowly towards the piano with both hands up, as feedback starts to emerge

RH

LH

stand away from the piano (at least 1m)

Spk4

Spk3

Spk2

Spk1

switch

Control the different emerging feedback frequencies focused in the vibration of the multiple metal objects placed on the strings.

RH

LH

Spk4

Spk3

Spk2

Spk1

(3')

RH

LH

Spk4

Spk3

Spk2

Spk1

switch

# espacio III

Semiautomatic computer/piano manipulation  
(from a different location or table in front of the piano)

RH  
LH  
Spk4  
Spk3  
Spk2  
Spk1

Close lid silently

Activate the different presets and computer functions that trigger different responses/processes inside the instrument.

Approx. pitch {

switch (1')

1. pull up faders slowly

Spk4  
Spk3  
Spk2  
Spk1

ff (p)

switch

2. activate frequencies (spk2 and spk3)

Spk4  
Spk3  
Spk2  
Spk1

sim.



Spk4  
Spk3  
Spk2  
Spk1

Musical score for the first system. It consists of four speaker channels (Spk1, Spk2, Spk3, Spk4) and a bass line. The top staff shows a melody with a sharp sign (#) at the end. The bottom staff shows a bass line with a series of notes.

Musical score for the second system. It consists of four speaker channels (Spk1, Spk2, Spk3, Spk4) and a bass line. The top staff shows a melody with a sharp sign (#) at the end. The bottom staff shows a bass line with a series of notes.

Musical score for the third system. It consists of four speaker channels (Spk1, Spk2, Spk3, Spk4) and a bass line. The top staff shows a melody with a sharp sign (#) at the end. The bottom staff shows a bass line with a series of notes.

(3')

3. Freeze frequency movement at irregular intervals

A musical score for four speakers (Spk1, Spk2, Spk3, Spk4) in a stereo configuration. The score consists of two measures. The first measure shows a continuous sound field with a freeze point indicated by a vertical line. The second measure shows the sound field after the freeze point, with the sound field appearing to have shifted or changed. The notes are represented by vertical lines on the staves, and the speakers are labeled on the left.



A musical score for four speakers (Spk1, Spk2, Spk3, Spk4) in a stereo configuration. The score consists of three measures. The first measure shows a continuous sound field with a freeze point. The second measure shows a complex sound field with multiple freeze points. The third measure shows a continuous sound field. The notes are represented by vertical lines on the staves, and the speakers are labeled on the left.



A musical score for four speakers (Spk1, Spk2, Spk3, Spk4) in a stereo configuration. The score consists of a single long measure. The sound field is represented by vertical lines on the staves. There are two "switch" points indicated by boxes below the staves. The measure ends with a double bar line and the text "(40")".