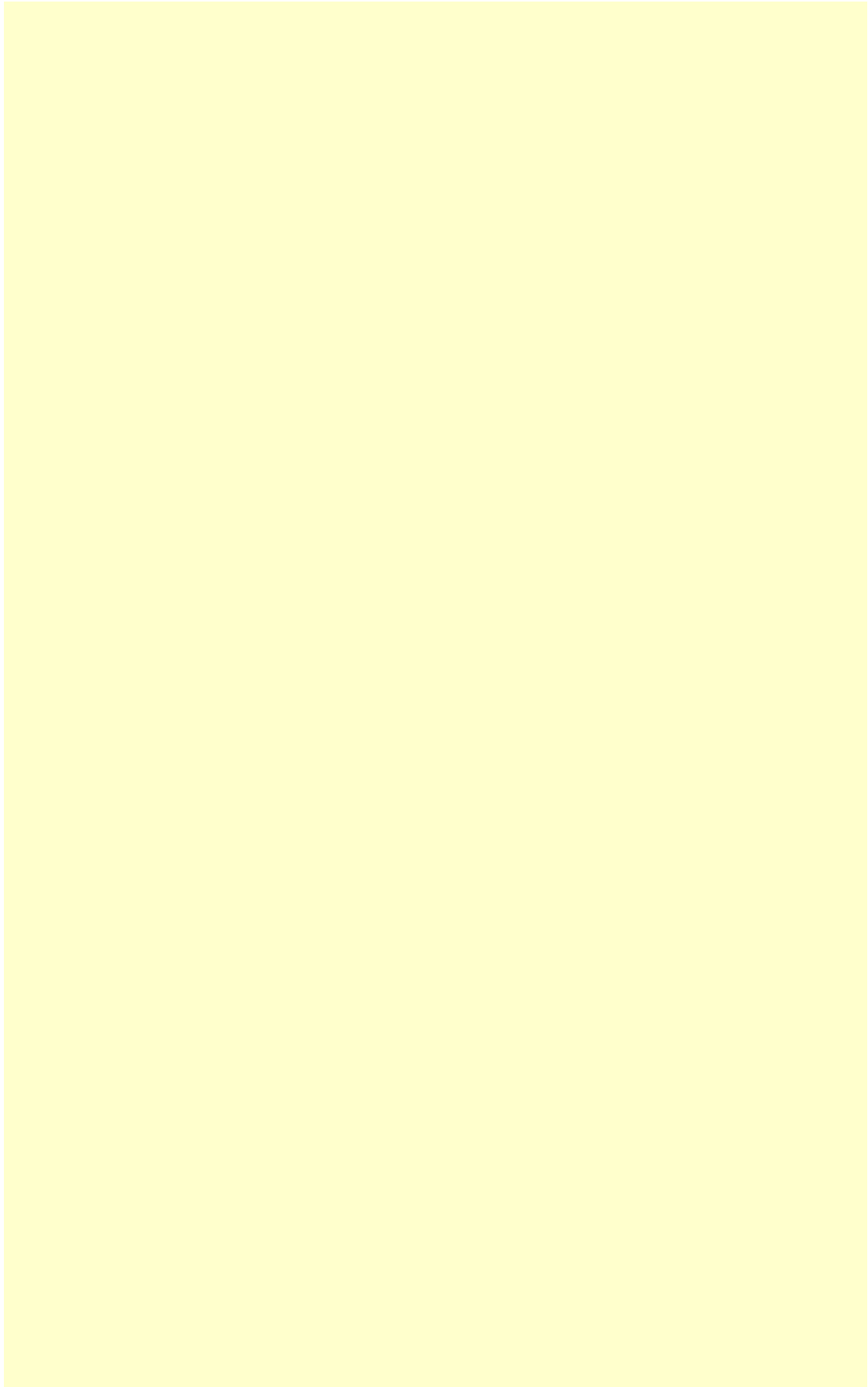


*Artificial evolution 29 (hin7459)*  
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## **Composer / Researcher**

Dimitri Voudouris

## **Composition**

A [EV]: 3070/7f

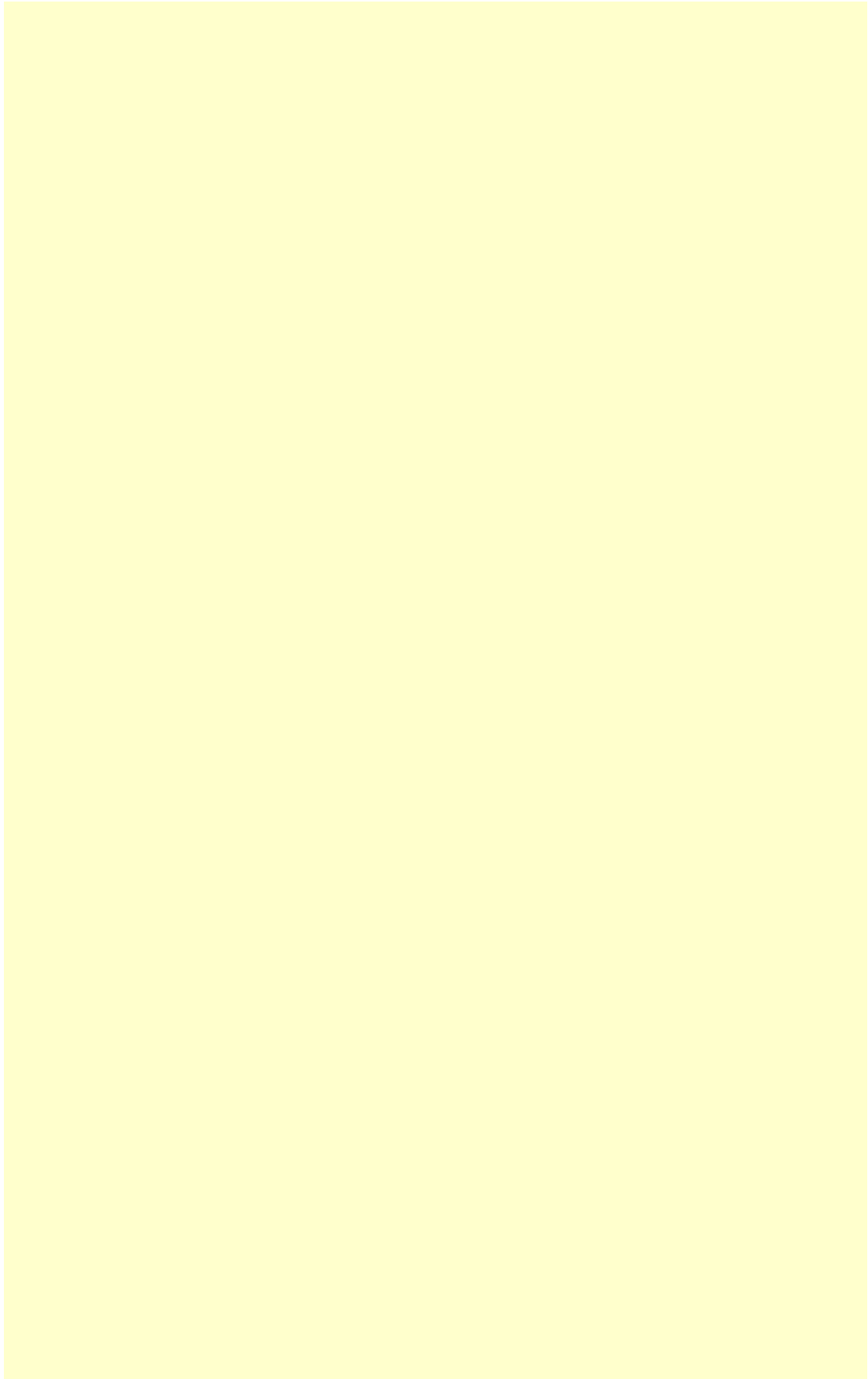
## **Composed**

[2013 - 2014]

## **Duration**

10 min 50 sec

*Artificial speech and singing synthesis,  
computer assisted electronics,  
[composition assisted by Matlab's  
computational autonomy]*



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## **Matlab in artificial symbiosis:**

*Matlab* is used as an assistant composer in A [EV]: 3070/7f computer music composition to solve mathematical problems. Partially developed sound fragments are presented to *Matlab* in bundles with a linear time restriction of 60 seconds. Emphasis, however, has been given to the ability of *Matlab* to perform computational tasks with minimum human intervention (computational autonomy) resulting in processing, positioning, adjusting, rearranging, selecting and precise splitting of sound fragment/s in a variety of ways. Constructing “colonial” sound “fragments” in which each fragment and its subordinate sound fragments form units similar to “clade/s”. The process of fragmentation and the possible structuring into group formations plays an important role in the mechanism of selection and strategic structuring of the environments.

### **Selection a process of symbiotic mimicking by Matlab:**

- [a] If sound fragment/s benefit or obligate from the coexistence [benefits in density, duration, pitch, intensity and velocity from the surrounding environment] while the other sound fragment/s coexist. They would primarily be selected in *Matlab* and processed and grouped, in group **one** of selections.
- b] If coexistence is beneficial for more than two symbionts. They would primarily be selected in *Matlab* and processed and grouped in group **two** of selections.
- c] If the original sound source (host) suffers from the coexistence but the other sound fragment/s neither benefits nor coexist. They would be rejected.

### **Matlab three steps in computation process:**

- 1] Processing is done in areas of density, duration, pitch, intensity and velocity.
- 2] Splitting of sound fragments.
- 3] Selecting , assembling, placing and positioning the sound fragments into the final composition module.

## Composition:

Artificial audio symbiosis: Is a construction, an interaction between different sound fragments existing in close physical association, typically to their advantage. In the construction of **A [EV]: 3070/7f** – *Artificial evolution is a process by which Matlab developed 60 sec sound fragments consisting of 176 sound compartments with a total 3070 sound files*. The environments constructed were placed together in the form of a puzzle. Each “biotic” compartment had morphological differences in various orders of positioning, density, duration, pitch, intensity and velocity. The computer was programmed [through Matlab] to statistically work out these variations with possible suggestions. Most sound compartments have environments within environments suggesting that within a complex system there are various possibilities that can change the outcome of the composition in a multiple ways. This process of adaptive artificial intelligence which leads us to an evolutionary splitting event in the construction of a sound “fragments” and the development of a greater variety of subordinates. This procedure resulted in 29 compositional modules or sound evolutions. A[EV]: 3070/7f is the evolution selected for this project, consisting of 55-60% contribution by the composer and the rest by the assistant composer.

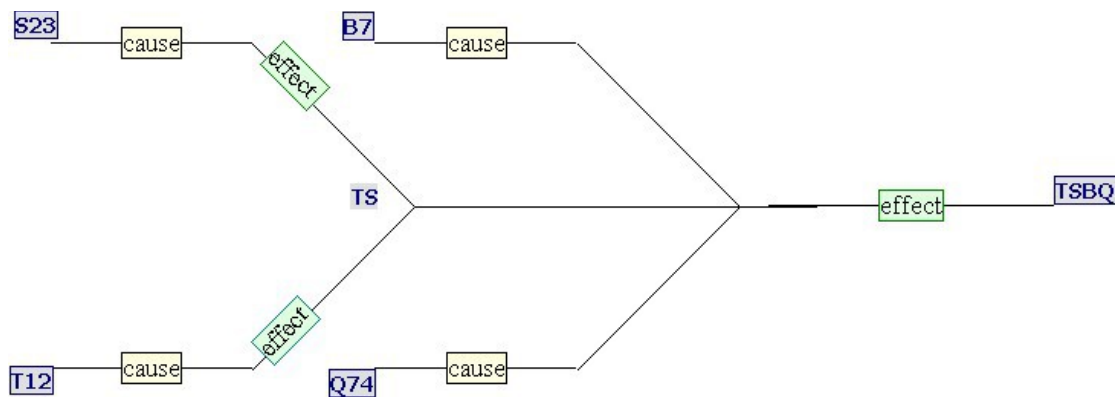
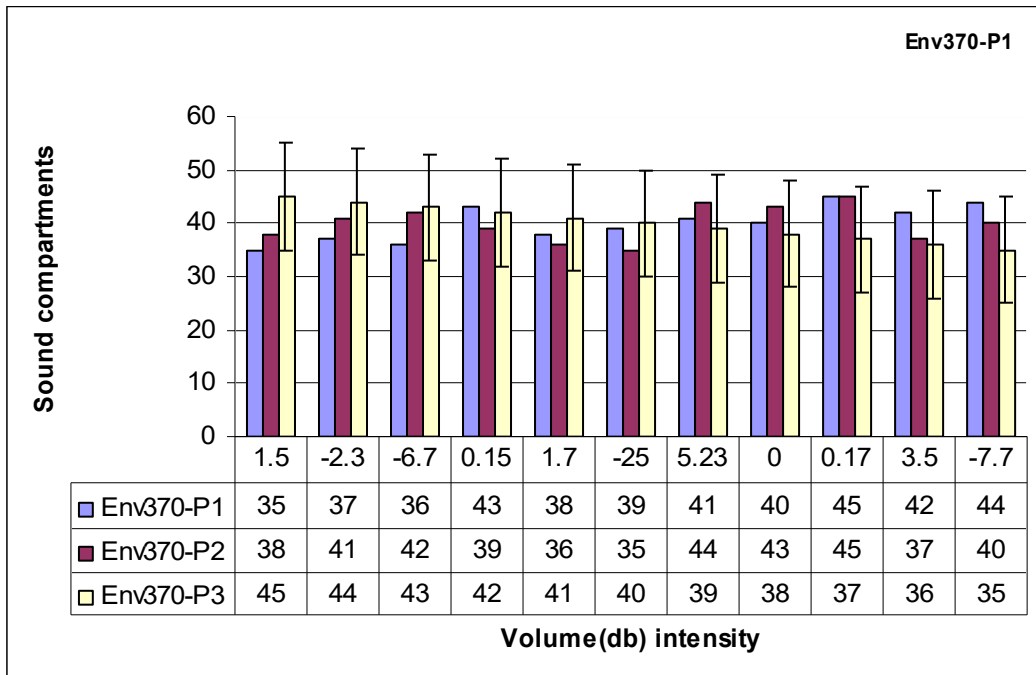
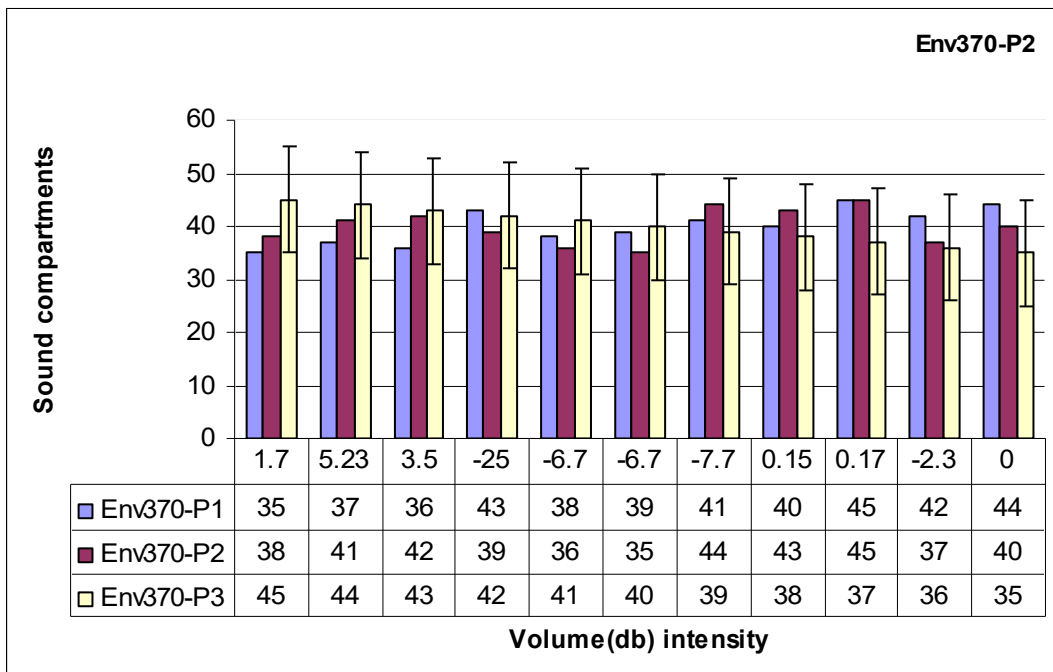


fig 1

*[Artificial sound] evolution – Formation of clades TS and TSBQ, with S23 [sound fragment/s] combined with T12 [sound fragment/s] having particular velocity, pitch, density, duration, intensity form a new audio segment TS [clade]. Further combining TS with B7 and Q74 results in an evolution of artificial new outcome of sound [clade] TSBQ.*



**fig 2**



**fig 3**



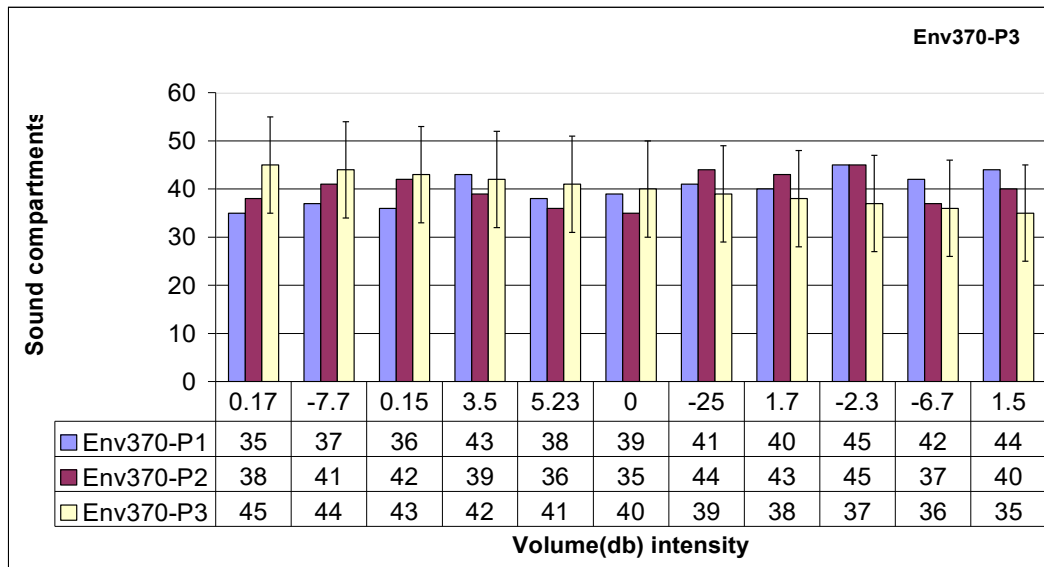


fig 4

fig 2, fig 3, fig 4 above showing different intensities created [Env370-P1,P2,P3 ] resulting in audio variation changes creating environments within one another producing different sound evolutions.

### Matlab methodology :

minutes	Introduction of bundled sound fragments [to Matlab]	Developed sound fragments
1	23	95
2	49	140
3	117	223
4	232	459
5	211	474
6	93	177
7	346	643
8	298	337
9	234	350
10	70	85
10.4	44	87

fig 5

3070 Matlab developed sound fragments made in 60 second time intervals used in A[EV]3070/7f.

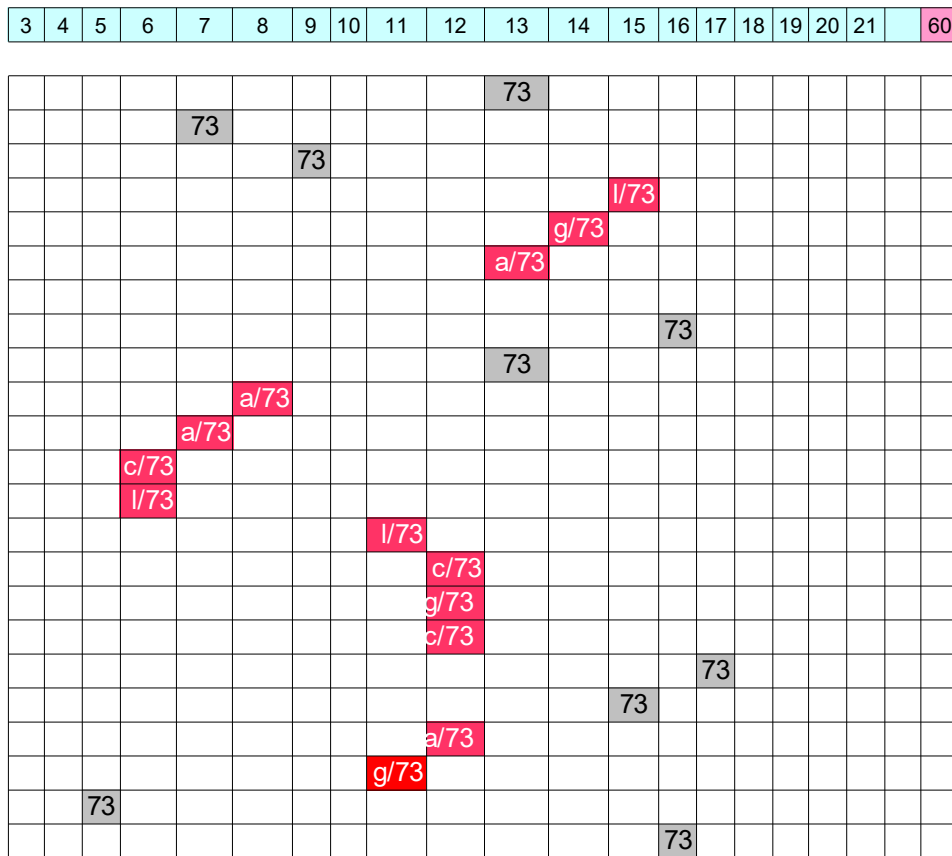
### Complex Systems :

“Colonial” sound fragment **73** constructed from a variety of combinations of (1-4) subordinate sound fragments namely:

*'colonial ' sound fragment 73*

*subordinate sound fragments - 1] a/73, 2] g/73, 3] c/73, 4] l/73*

Time



**fig 6**

*23 assembling fragment selection processes within 180 second time interval.  
 The biological selection resulted in 4 sound placements. The highlighted data similar to clade formations [each with different density, velocity, pitch and intensity but similar duration ]  
 - sound fragment 73 .*

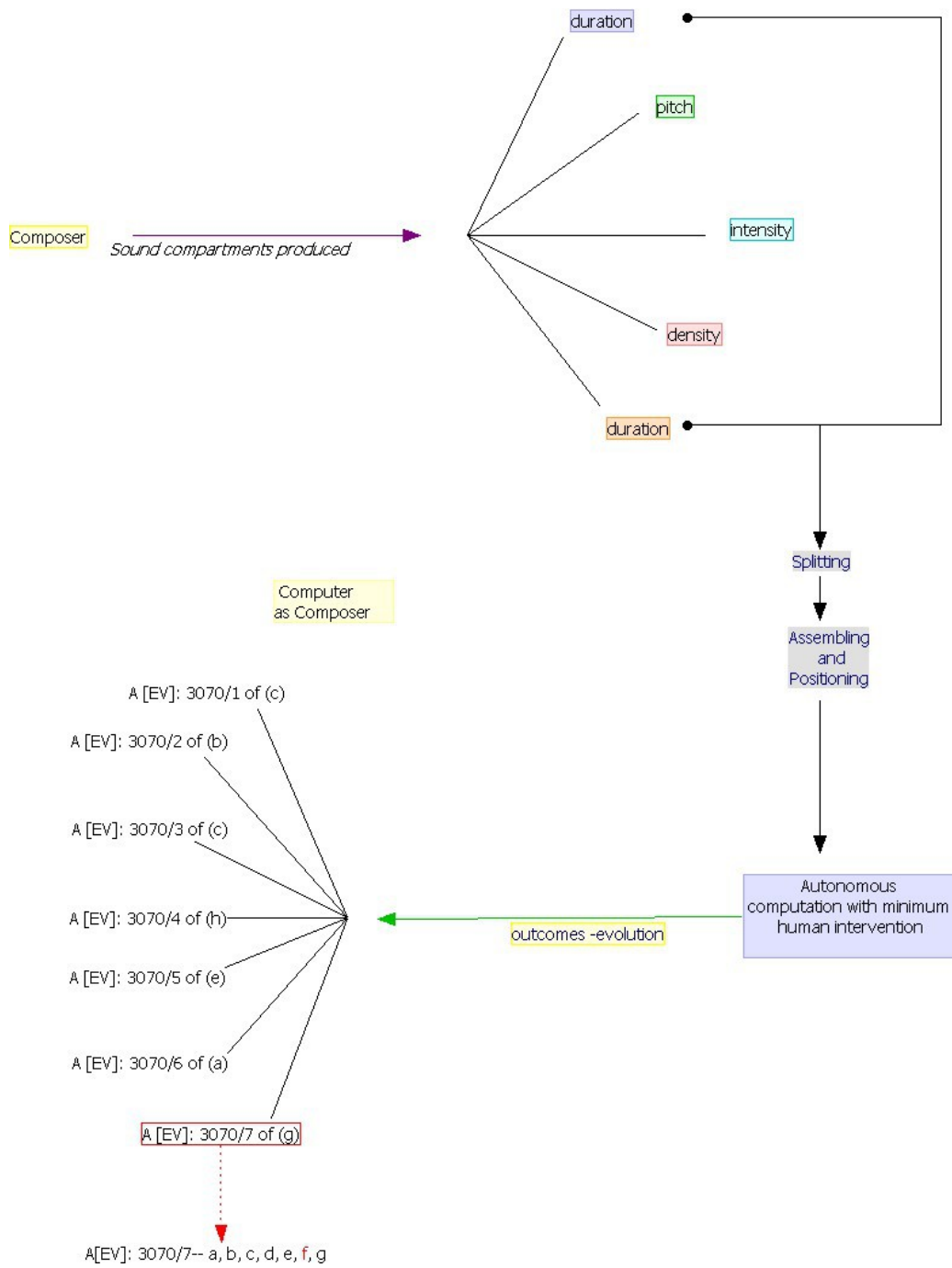


fig 7

Composer / Computer process of decision making in outcomes artificial evolution

## Performance:

### Diagram for the performance of A[EV]3070/7f

- 1] If audience is standing the height of speakers 1.8 meters  
If audience is sitting the height of speakers 1.2 meters  
Tilted 20° down
- 2] Speakers to be positioned 50cm from the wall
- 3] If as in the diagram the diameter of the audience space is 6 cm then the distance apart of [S1a and S1b] should be 1cm. Similarly for S2a and S2b, S3a and S3b]

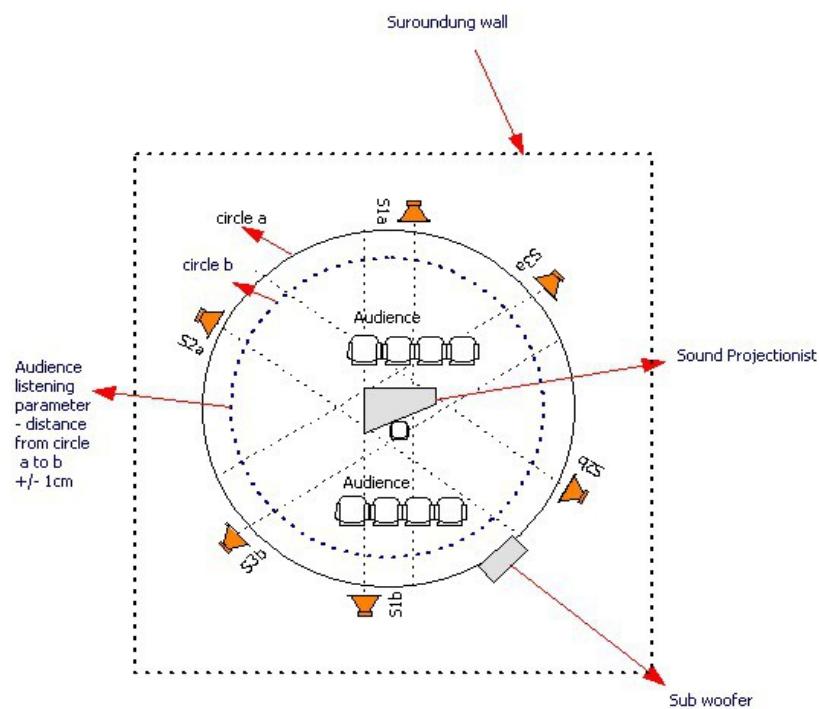


fig 8

- 1] 6 active audio speaker monitors and sub-woofer.
- 2] All channels to be positioned a +6 db throughout the performance.
- 3] A [EV]: 3070/7f is to be performed in total darkness [only minimal light for sound projectionist].

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