HOW MANY DIMENSIONS ARE THERE IN OUR UNIVERSE? 5

The issue under discussion here is the dimensions of the universe. The dimensions possess certain features that have been identified in this research indicating that the dimensions of the universe are 5. The analysis is carried out in such a way that the process leading to the final conclusion is made clear, and, in the end, there is a correlation between the conclusions that have been drawn earlier in order to convey the best possible image of reality. The mathematical theory is developed, even though theory is equally significant, so that there may be a solid basis for the comprehension of proof.

First of all, it is worth recalling what the outcome of the universe is; it is the existence of intelligent and unintelligent life. To get this result, it is necessary that the existing conditions correlate and interact between themselves. These very conditions have specified and carry on specifying sets, which are governed by laws and interact between themselves; for instance, the correlation between the earth and the moon, our solar system and other ones creating galaxies etc. There is therefore a total result in various forms, and not an individual one. Perhaps, all this appears to be unnecessary, but it is good always to remember what surrounds us, since it will be of use to us later.

The analysis begins from the three already known to us all space dimensions. We shall notice the features that they develop as they increase, whereas we shall examine what “exists” when there are no dimensions at all. Throughout our analysis, information will play a key role. **Information** is the common meaning attributed to a simple or complex symbol of two or more subjects. As a term, it is a complex one denoting the words “carry” and “complete.” In other words, the term “information” refers to something that is complete and clear.

(A)Therefore it is as follows:

1) Suppose that there are no dimensions at all and, thus, nor does a universe exist as we may possibly perceive it. In that case, the information about everything that exists to this day is collected in an entirety or an infinite point —call it as you may— that is integral. It is therefore as follows:

A) 0 ← there is a total of zero dimensions. All information is collected in an infinite undefined point.

2) Suppose now that a one-dimensional universe comes into existence, and whatever appears in it is one dimensional too. The result is as follows:

B)

Graph 1 o

Σχ.1 _____ χ

o

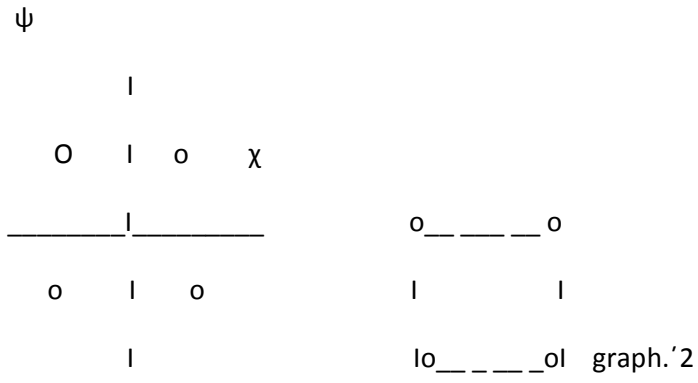
graph 1 0_____0

All this information is displayed in an x dimension, which definitely needs 2 points to be created. Points ´1, ´2.

Now, it is useful to give a definition of the *point.* The *point* is defined as the result of the creation of a certain dimension, it reveals its impact on information and universe, and, at the same time, it is the least possible required.

The above-cited graphs show, therefore, that when information is displayed in 1 dimension, it needs at least 2 points including all the initial information.

3) Suppose, now, that there are 2 dimensions. The result is the following:

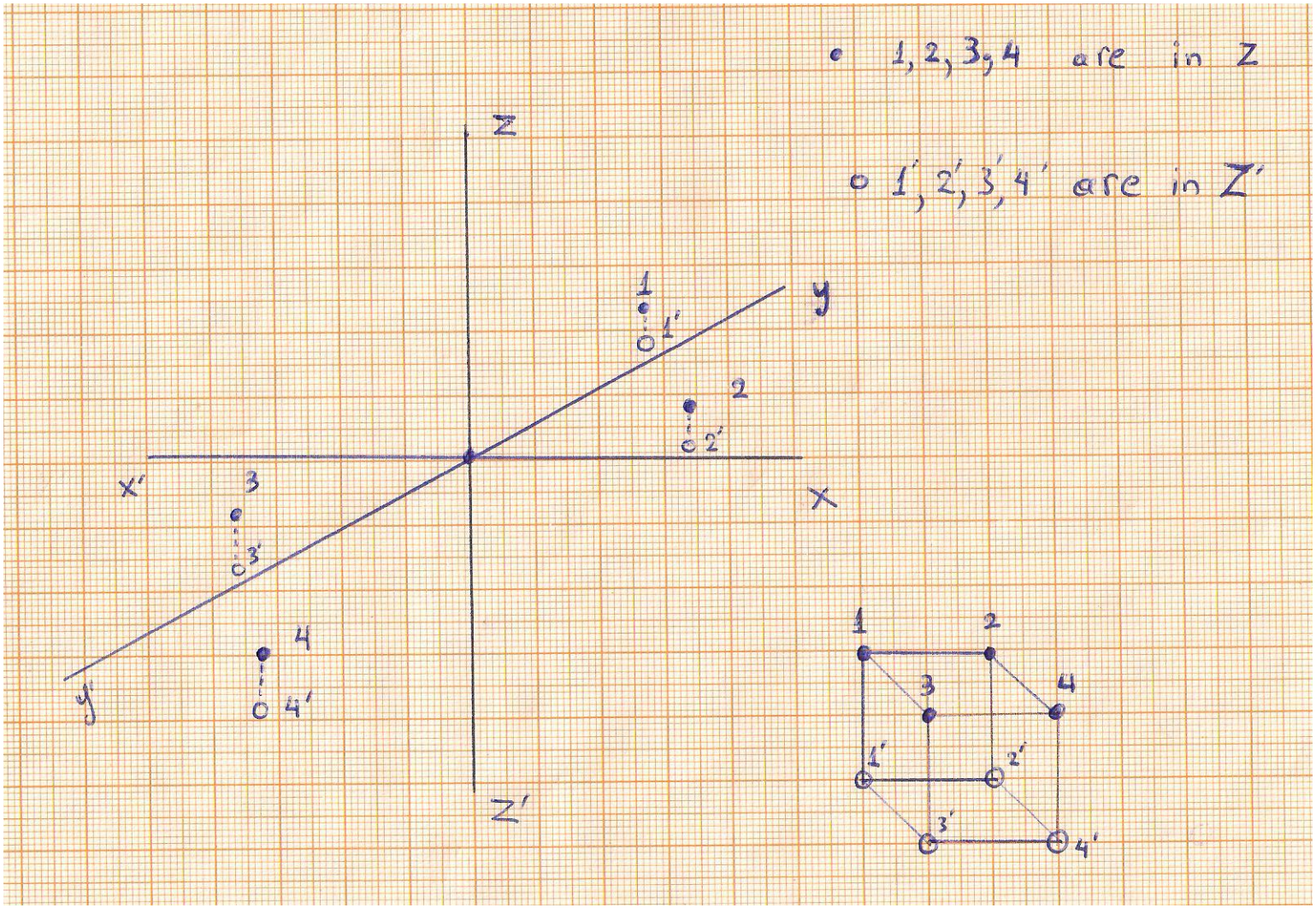


graph.2

Again, all the initial information is displayed in 2 dimensions: x, y. As a matter of fact, all 4 points: ´1, ´2, ´3, ´4 are necessary for it to come into existence.

The existence of these points makes it clear that there is a flat universe, namely a two-dimensional universe. These points develop on the x, y axes — our dimensions.

4) Let us, now, suppose that there are 3 dimensions


• 1, 2, 3, 4 are in Z
o 1', 2', 3', 4' are in Z'
Z
y
X
x'
y'
Z'
1
1'
2
2'
3
3'
4
4'

We possess all the initial information displayed in the following 3 dimensions: x, y, Z. As a matter of fact, 8 different points are needed for it to come into existence. These points are developed on the x, y, Z axes —our dimensions. The existence of these points make it evident that there is a 3-dimensional universe.

Before we proceed to a further analysis, let us make the following observation: the way that the points increase when the dimensions also increase is determined by the following mathematical relation:

$\sigma = 2^{\delta}$, σ = point / δ = dimension

e.g. $\delta = 1 \rightarrow \sigma = 2$, $\delta = 2 \rightarrow \sigma = 4$ …

This formula will be of use to us as this analysis progresses.

5) Now the issue of time will be analyzed. The dimension of time has the following result in the prior 3 dimensions:

Suppose there is a 3-dimensional body K at a t1 point in time. Supposing there is the same body K at another t2 point in time, where t1 is prior to t2. This suggests that body K existed at both of these 2 points in time. Result: Kt1 → Kt2.

In consequence: 8 points in Kt1 and since it is at t2 point in time, where t1<t2, t1 different from t2, then body K has another 8 points in Kt2.

Result: 8Kt1+8Kt2= 16 points in all.

The result is 16 points in all that definitely exist. In that case, the formula $\sigma = 2^{\delta}$ continues to be valid:

$\delta = 4 \rightarrow \sigma = 16$

6) The dimension analyzed below is the 5^{th} one.

Suppose, therefore, that there is a body Kti, where i =1,2,3,4,5,6,7……, which exists at different points in time. Then the following question may arise: Kti is found in a 4-dimensional universe, and it moves around this space in different parts and at different periods of time. How, thus, such a change is perceived —the change in progress.

In consequence, if it is an entirety without a reference point, then change is meaningless. In order that it may be meaningful, it needs another body Λ, where Λ is different from K, which is, at least, to have the same dimensions as body K. Thus, Λ will be the reference point, on which changes developing in K and vice versa will make sense.

Therefore, there are 16 points of Kti+16 points of Λti=32

The mathematical relation $\sigma = 2^{\delta}$ still leads to the same result:

$\delta = 5 \rightarrow \sigma = 32$.

Henceforth, we shall use the mathematical formula that connects the dimensions with the developing points $\sigma = 2^{\delta}$, where $\delta = 0,1,2,3$ ….

(B)

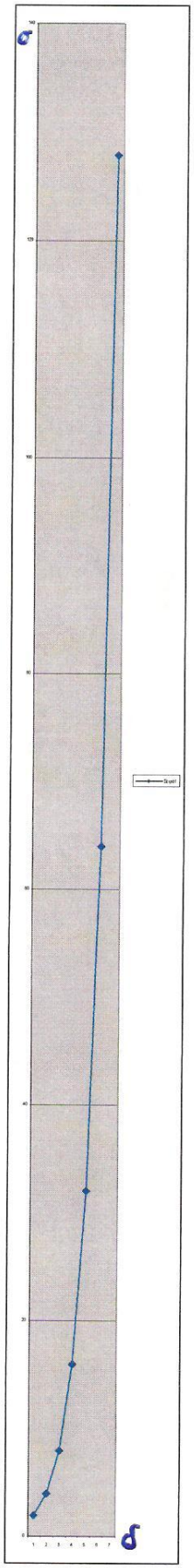
In the 1^{st} part of the project, it is evident that there are 5 dimensions without, though, excluding the possibility of the appearance of more dimensions. In the next section, we shall prove that the development of our 5-dimensional universe is the best possible choice of nature.

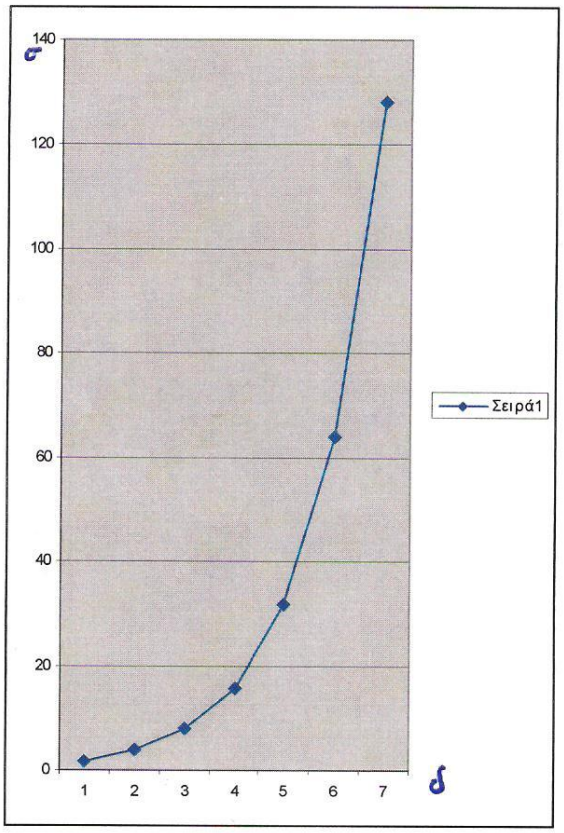
Before moving on, let us add that relation

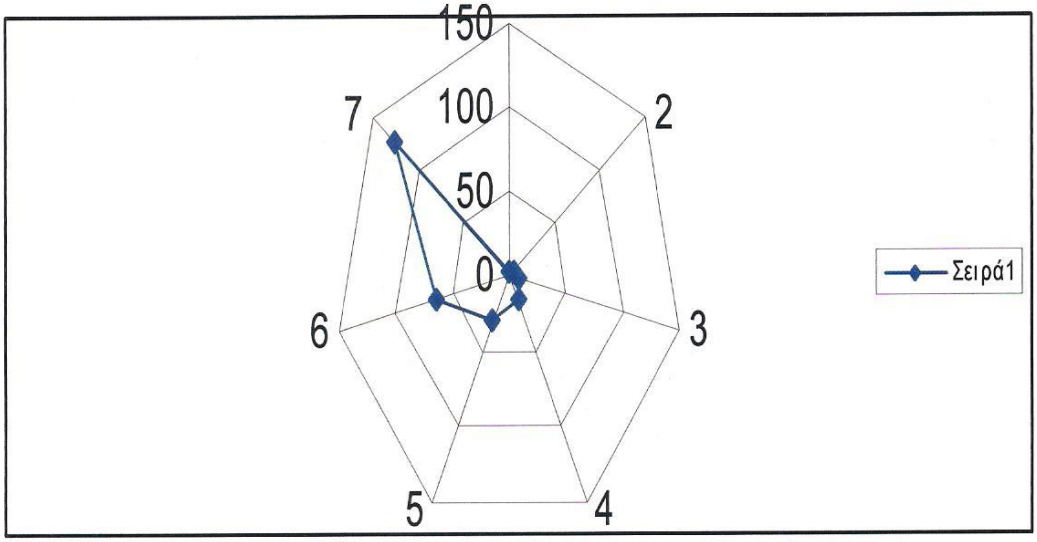
$\sigma = 2^{\delta}$ gives us the following result:

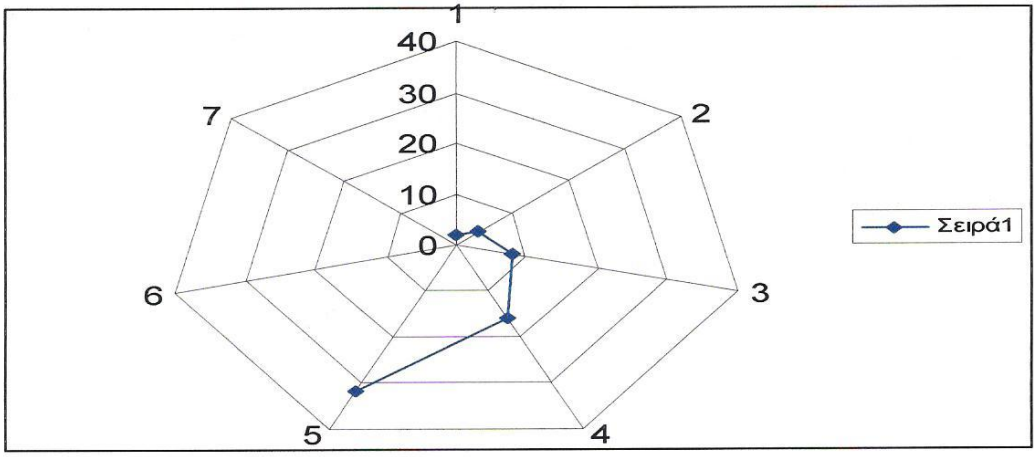
$\ln\sigma = \ln 2^{\delta} \rightarrow \ln\sigma = \delta \ln 2 \rightarrow \delta = \ln\sigma / \ln 2$.

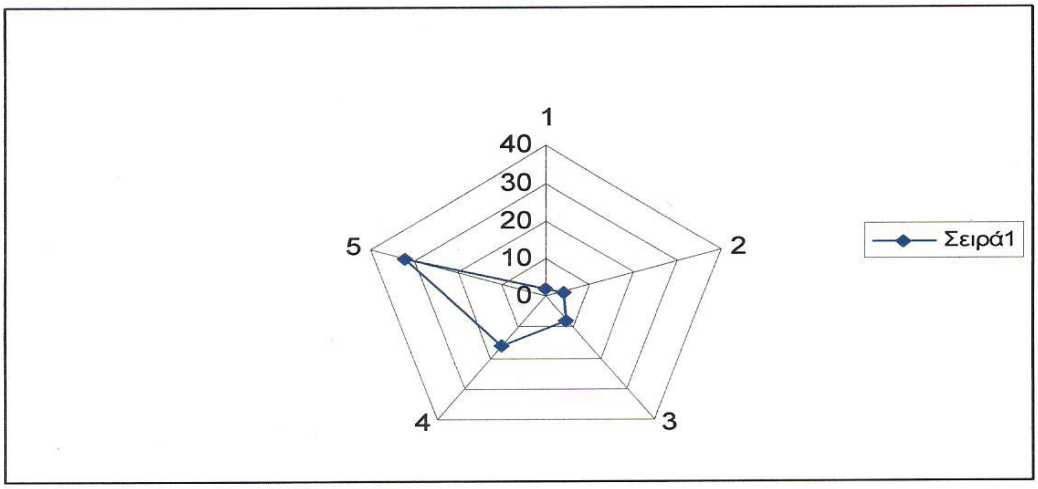
These dimensions are equal to ln of the points in relation to ln2. By drawing the representation of this mathematical relation, we conclude that:




140
120
100
80
60
40
20
0
1
2
3
4
5
6
7
Σειρά1







Graph 1 is of the right proportion, the 2nd one, though, is simply to show what is displayed on Graph 1 to our assistance.

Furthermore, it is, also, represented on an arachnoid graph so as to have a more complete picture of its development in spiral form. On these graphs, at first a random reference to the 7^{th} dimension is represented, then the form of the 5^{th} dimension is displayed in such a case, namely an open development, and eventually the possibility of a close type 5^{th} dimension.

Thus, for each added dimension, the points that develop and correspond to this dimension increase at a fast rate. So, from the 5^{th} dimension onward, it can be observed even with naked eye on Graph 1 that the points have grown to such an extent that the pitch of the angle of the function in relation to y axis has almost been eliminated.

Carrying on with the project on the correlation between points and dimensions, we find the average price of the points, which is equal to the number of the points in dimension i in relation to dimension i. The results are as follows:

$\sigma_{\delta i}$ = average price = $\sigma_{\delta i}/\delta_i$

$\delta=0 \rightarrow \sigma_0 = 1/0 = 00 = -$

$\delta=1 \rightarrow \sigma1 = 2/1 = 2$

$\delta=2 \rightarrow \sigma2 = 4/2 = 2$

$\delta=3 \rightarrow \sigma3 = 8/3 = 2.6$

$\delta=4 \rightarrow \sigma4 = 16/4 = 4$

$\delta=5 \rightarrow \sigma5 = 32/5 = 6.4$

$\delta=6 \rightarrow \sigma6 = 64/6 = 10.6$

$\delta=7 \rightarrow \sigma7 = 128/7 = 18.28$

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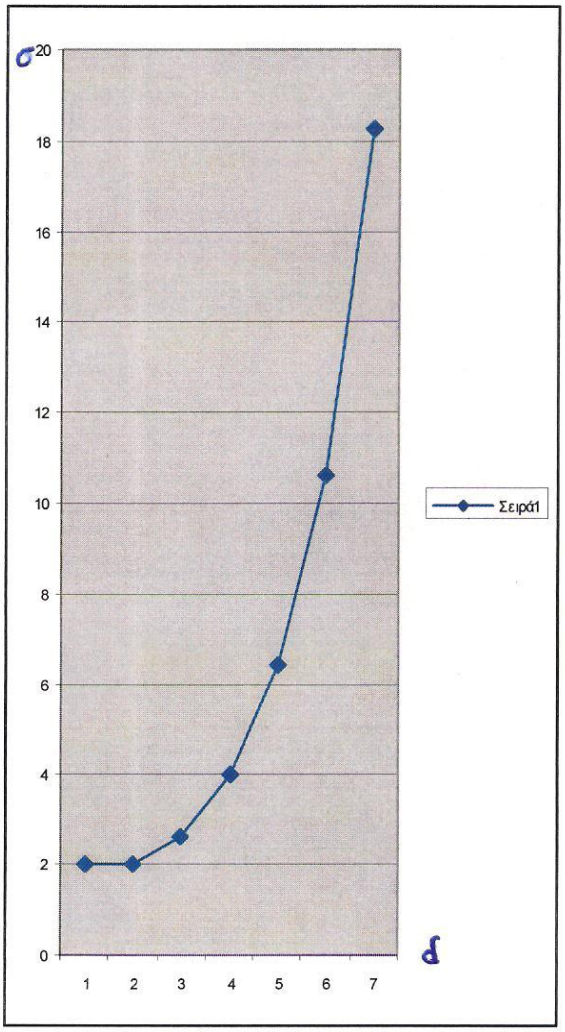
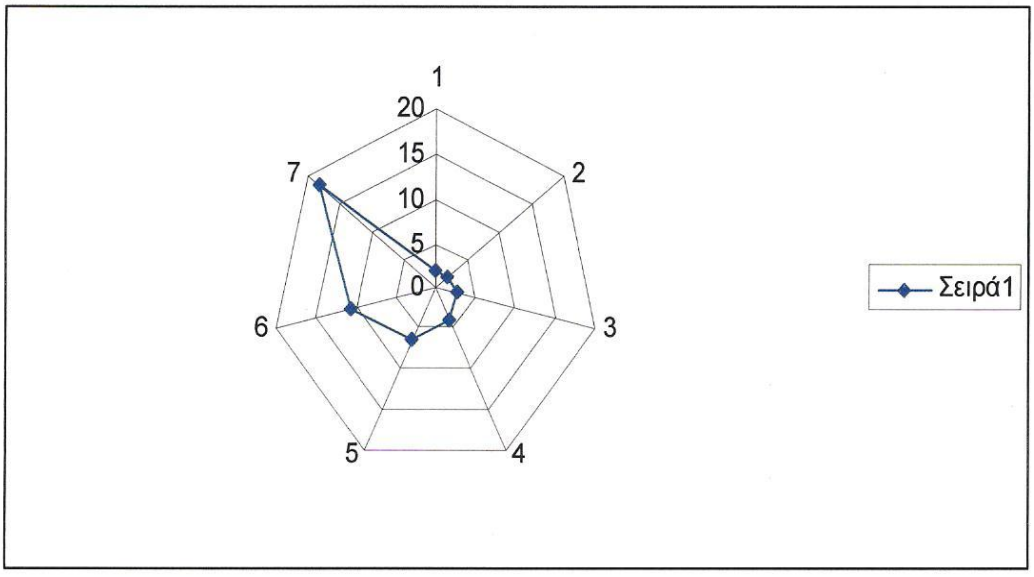
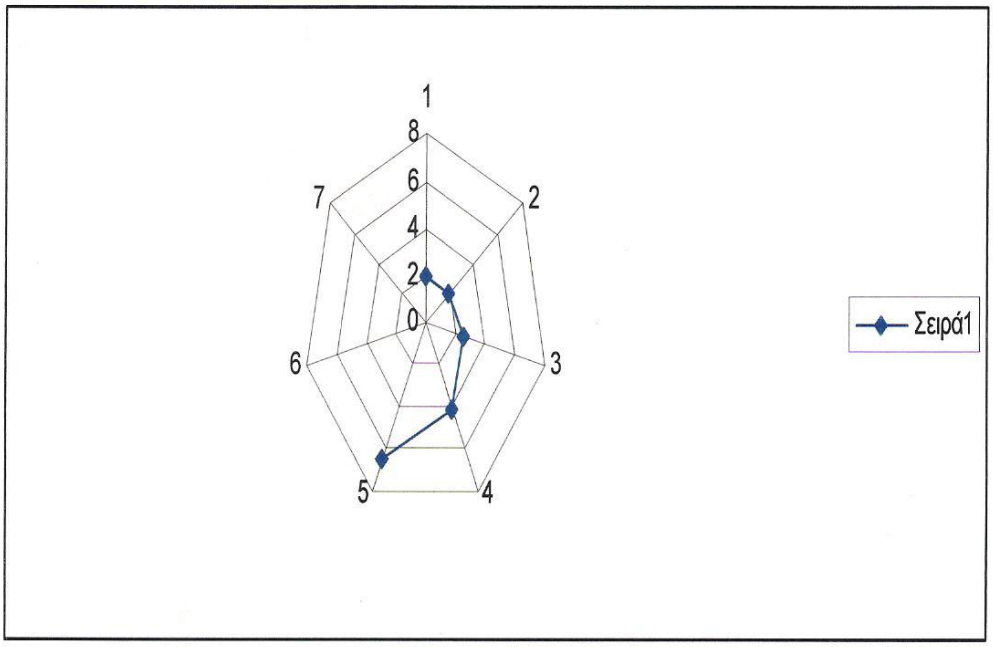
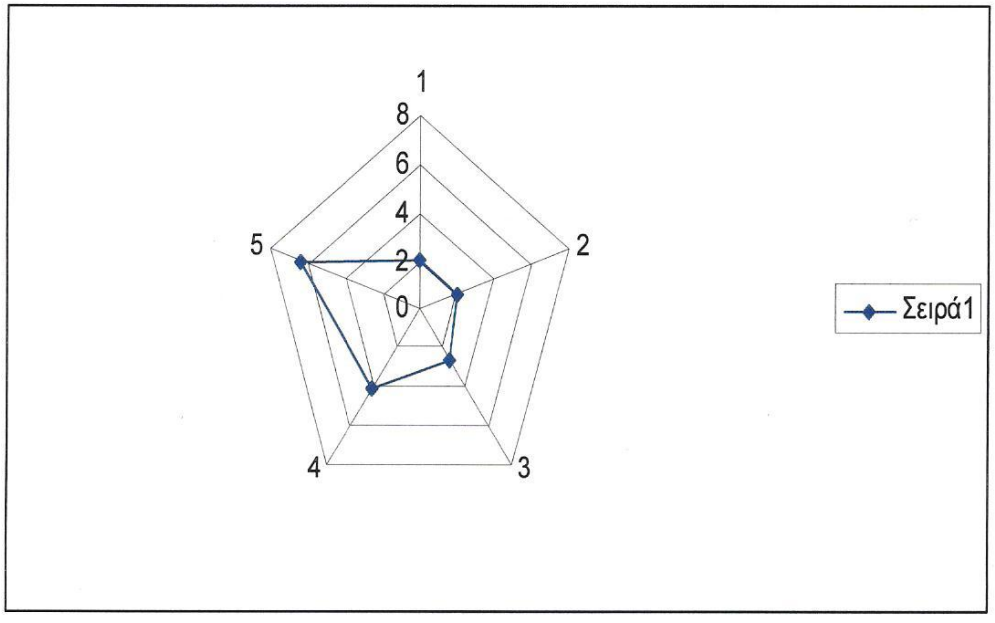
Their representation gives the following diagrams:






1
2
3
4
5
6
7
8
0
Σειρά1


1
2
3
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5
8
6
4
2
0
Σειρά1

Again, we receive a simple representation as well as an “arachnoid” representation in varied forms. In the 1st case, it is in the random dimension 7, and in the same dimension we get a representation of the 5th dimension in open form. In addition, on the same final graph, there is the 5th dimension in close form. We, also, remark an increase of the points from σ1 to σ5 on Graph 1 twice or three times. This may suggest that a geometric increase of the points is not possible to continue unceasingly. In the event of such a perpetual continuation, conditions of lack of communication among dimensions would be formed. After all, let us never forget that the universe possesses information and every additional dimension splits this information, and, in turn, this information is split into the points it brings into existence. Hence, there are as many dimensions in the universe as necessary so that life and highly complicated beings may be created, and, at the same time, there can be the possibility of communication among them so as to avoid stirring up chaos. Such a possibility of communication is nothing else but the various laws of physics that control the universe.

Therefore, the increase of dimensions Δ entails an increase of “life” Z as well as changes M in the universe, granted that the choices of a body within such a universe grow. At the same time, a reduction of communication E is required. In other words, it is an issue of maximizing “life” with the restriction of communication within it, or the increased flow of information to each one for ideal communication among them.

The whole issue may resemble the efforts of a chef to enhance food with certain properties e.g. make it tasty as well as healthy with its ingredients in perfect proportions. The first thing that comes to mind when referring to proportions is the golden ratio —known as the divine proportion too. The golden ratio gives us the number Φ = 1,618 and, it is the point (from a given aligned section) that the ratio of the “total size – section” in relation to the greater section IS EQUAL to the ratio of “the greater section” in relation to “the

smaller section.” In that case, the ratio is equal to the GOLDEN NUMBER, that is to say Φ = 1,618034.

At this point, it is worth mentioning that the logarithmic spiral, which is based on number Φ, does not change its shape as it grows in size retaining its form, and, at the same time, its shape grows exponentially. Moreover, it tightly coils around the center, but after a number of successive coils it loosens as the distance from the center becomes greater.

By taking all this into account as well as analyzing the way that the average prices σi increase, it is as follows:

Δ	μ.τ.σα= σα/δα	μ.τ. σα+1/ σα
0	-	-
1	2	-
2	2	1
3	2,6	1,3
4	4	1,538
5	**6,4**	***1,6 = Φ***
6	10,6	1,656
7	18,2	1,71
.	.	.
.	.	.

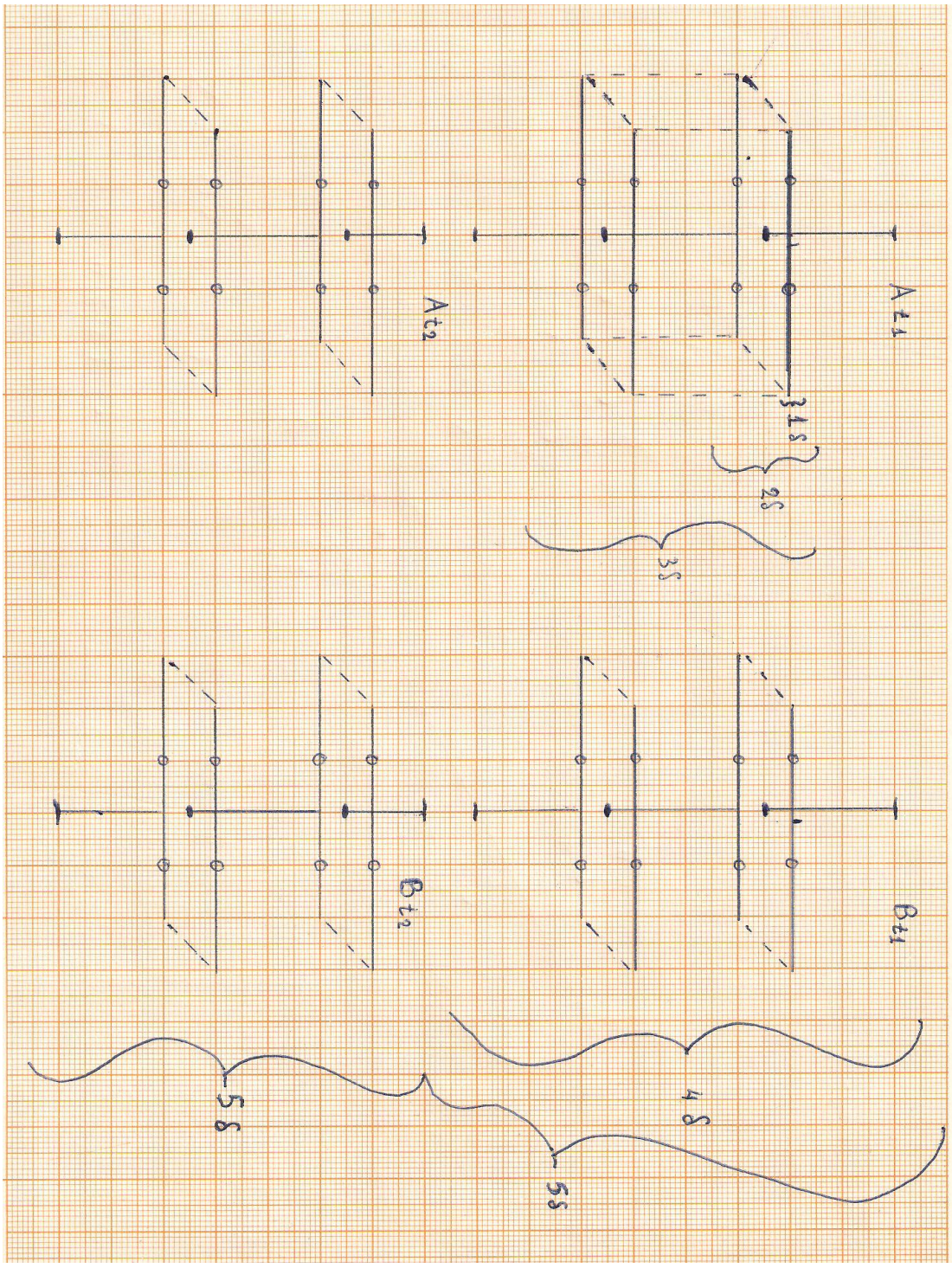
The average prices of the points increase gradually. To put it simply, nature continually expands its dimensions until it reaches the ideal dimension. The average price of the points of the ideal dimension increases in relation to the prior “golden” proportion Φ. The point on which the golden proportion is attained —approximately 1, 6— is the increase from σ4 to σ5. Therefore, the golden proportion is attained in dimension 5, that is, the point at issue.

Nature has selected the 5^{th} dimension as the perfect choice, on the grounds that there an ideal growth of this size occurs. From that point upward and from that point downward, we get both an unnecessary and a deficient result too. At the same time, on graph 4, we observe the appearance of a pentagon in which a point–dimension close spiral develops —this shape was the one that led the Pythagoreans to the discovery of Φ corresponding to the golden ratio, which appears in a great number of geometric elements of a regular pentagon. In other words, nature has selected the 5^{th} dimension featured by the greatest harmony as to the way it grows up to its surrounding shape.

Of course, the present analysis would be incomplete if it ended at this point, seeing that the dimensions —as someone might easily observe— are unlikely to develop in a way that, for simplification reasons, we initially accepted. The development is woven and interrelated in such a way that we get what is called spacetime as a whole, aside from that having the concept of the reference point, which is closely related to information. Thus, we make the following observation: the dimension of the reference point existed prior to the other dimensions because the creation of a one dimensional object, e.g. A, calls for another already existing object B in order that the existence of object A may be meaningful. However, there cannot be any reason for existence unless changes occur —after all, thanks to a certain change bodies A, B have been created and, therefore, time is already present in these dimensions.

Taking all the aforementioned into account, the growth of dimensions in space and time are tightly interwoven with the ones of time and the reference point of information. It is, also, noteworthy that the growth of any other dimension is preceded by the dimension of time and the reference point of information; this will as well be shown on the following diagram, which is more advanced and it presents the way they develop as well as the points included, and, at the same time, we shall understand the essence of dimension although it is not the objective of this project.

In consequence:


A t1
A t2
1 s
2 s
3 s
B t1
B t2
4 s
5 s
5 s

By the way the graph is laid out, we understand that the first space dimension comes first into existence, then the second dimension grows, which, in fact, is the reflection of the first one. Its growth is parallel and it creates the level. Next, reflection is produced resulting in the appearance of the third dimension. In other words, the first two dimensions on the virtual axis double forming the cube. Virtually, the reflection on every new dimension of the prior ones suggests the advancement towards a common reference point, and the fact that they grow is, also, an indication of time. It is, therefore, the 2 dimensions unlikely not to exist, since, thanks to them, the other dimensions both grow and become complete as well. To put it simply, although the development depicted on the initial graphs is gradual, we can see here that the four virtual axes coexist with one another as they make up those two minimum bodies that need to exist so that a reference point plus their presence in various points in time may exist too. In consequence, the first dimension in space can grow, then the second and the third one successively, but all this development occurs within the scope of the conception of reflection that is based on the concept of time and reference point of information. This is why —as soon as their growth ceases— we get the automatic reflection of body A at the creation of body B, which, in fact, is the fourth dimension, whereas the fifth dimension of time is nothing else but the reflection of the two prior bodies A, B within a time t2, which differs from t1 —points in time initially developing.

We, therefore, conclude that dimension is growth through constant reflection of the prior completed sets, which consider the following set as the initial one:

$\delta = (\ln k/\ln 2)+1$, where k=1,2,4,8,16,32,64,……

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