

### **Mathematical and physical logic ( busted )**

#### **( Explained to the members of the Academy of Kabbalists )**

The big Piergiorgio Odifreddi, for me always a great inspiration of good mathematics and science, has inspired to me two new concepts that perhaps were already latent in my brain, ( because after all I have been fossilized on the same things for years ) but that are now, thanks to him, coming back to my mind.

The first concept has to do with mathematical logic ( or better with elementary arithmetic ) and the second is only a concept that has to do with the explanation of a physical phenomenon.

Fine ! Let's start with the math. The problem is two-fold, and however, has the same origin: the division and the numbers at the denominator. The two problems are the division by zero and the division by infinity.

Let's take a simple computer as a Sharp EL - 334 E operated with solar battery and with 10 digits in the display.

If with this computer I do the following operation:  $0 / 0$  the result it gives me is 0, that is, a result that would cancel out, as we saw, the photon' energy ( destroying the structure of quantum mechanics ) . God forbids !

For years, however, I have said that the result of this operation must be:  $0 / 0 = 1$

### **Demonstration**

We have seen that 0 is the accumulation point of the series  $1 / n$  as  $n$  goes to infinity.

i.e.:

Lim  $1 / n$  for  $n$  tending to infinity = 0 then we can write

$$1 / \infty = 0$$

And its reciprocal is:

$$\infty = 1 / 0$$

These are the equations of Brahmagupta.

We also said ( in the Talmud of Scicli ) that mathematical logic implies that  $0 / 0 = 1$ , and therefore we can substitute 0 with the value  $1 / \infty$  and then write:

$$1 / \infty \text{ divided by } 1 / \infty = 1$$

and since the two infinities cancel each other we would have the demonstration that  $1 = 1$ , which is proof that  $0 / 0 = 1$

Once understood this , let us now try to understand what is the logic of the computer.

If I divide with the computer:  $1 / 1,000,000,000 = 0,000.000.001$ , I get a 10-digit number that is close to 0, but it is not 0, because the computer is limited to ten digits. If I had another most powerful computer I could split 1 in a huge number of digits, but not into an infinite one, because unfortunately the mathematical logic of the computer does not accept that the 0 and the  $\infty$  are numbers. If it accepted this concept it would be easy to write:

$1 / \infty = 0$ . Right?

If I divided two equal numbers almost zero between them, like a billionth divided by a billionth:

$0,000.000.001 / 0,000.000.001 = 1$ , in this case the machine would have no problem to give me as a result 1, so why then it refuses to accept that  $0 / 0 = 1$ ?

We have seen that I can remedy to this problem with a trick: instead of writing  $0 / 0$ , we can write  $1 / \infty = 0$  divided  $1 / \infty = 0$ , and since the two cancel each other out, we get that  $1 / 1 = 1$  and we solve the problem eliminating the infinity problem. The problem would be resolved elegantly if we could get the computer to accept that 0 and  $\infty$  are numbers, but unfortunately there are those ( not Kabbalists ) who oppose this solution. However since the infinities cancel out, it doesn't matter if they exist in nature or not. We can define them *mathematical entities* and thus solve the problem.

Well, let's see now the second problem.

If I divide by the number 9, all the integers from 1 to 9, I get this strange result:

$$1/9 = 0, 111111111 \dots$$

$$2/9 = 0, 222222222 \dots$$

$$3/9 = 0.333333333 \dots$$

$$4/9 = 0.444444444 \dots$$

$$5/9 = 0.555555555 \dots$$

$$6/9 = 0.666666666 \dots$$

$$7/9 = 0.777777777 \dots$$

$$8/9 = 0.888888888 \dots$$

$$9/9 = 1 \text{ (or } 0.999999999 \dots \text{)}$$

The sum of all the numbers to the right of the = sign are approaching 5, without ever reaching it, so the final result is:

$$4, 999999999 \dots$$

To get 5 I should have infinite time and infinite patience (gifts that only God possesses).

If instead I add the numbers to the right of 0 as follows:

$$1/9 + 2/9 + 3/9 + 4/9 + 5/9 + 6/9 + 7/9 + 8/9 + 9/9 = 45/9 = 5$$

without problems of infinite decimals. All fractions have the same denominator 9, then adding up all the numbers in the nominator I get 45, which divided by 9, gives 5.

With the sum of the numbers on the nominator of the fraction and the reduction of all the addenda to the lowest common denominator, I eliminated the infinities ! In this case, the least common denominator is 9.

Let's go now to the sum of infinite zeros that according to me should be 1 as follows :

$$0 + 0 + 0 + 0 + \dots + \infty = 1$$

If instead of writing the zeros, ( which my computer does not consider numbers but non-entities and therefore for its limited brain a 0 divided by any number is always 0 ), I used here the same tricks, the operations would be accepted by the computer more easily.

We have seen that to get to zero I can divide any number, by an infinite number like this:

$1 / 1.000.000.000.000.000.000 \dots = 0,000,000,000,000,000,001$ , and I could get nearly 0, and then I could use this system to get the zero I need. But with this system I always get that annoying 1 at the end. I would need an infinite time to get to a whole 0, without decimals. But if we use the old trick of dividing each number of the infinite series of natural numbers by infinite, we would solve the problem, fooling the computer ( we are men or apes? ) using ingenuity.

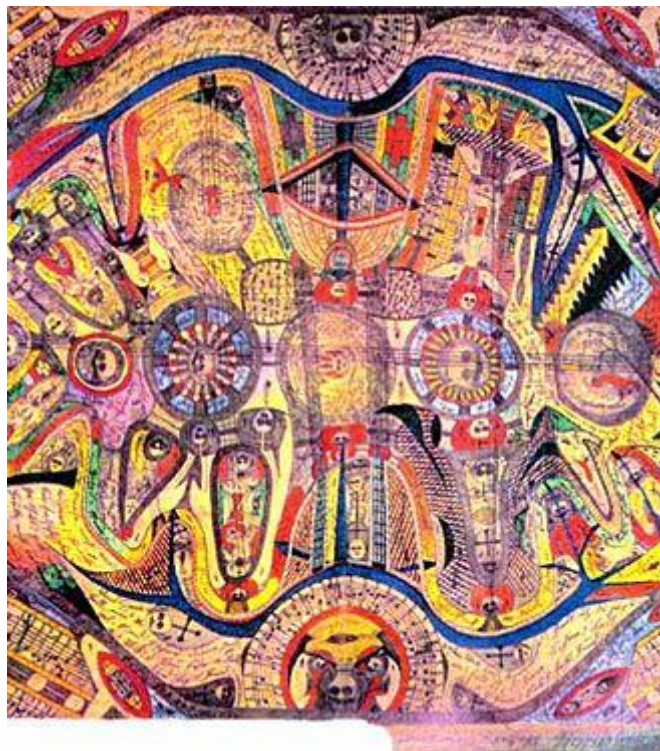
Then we could write:

$$1 / \infty + 2 / \infty + 3 / \infty + 4 / \infty + \dots + \infty / \infty = 1$$

Reducing to the lowest common denominator this sum we have at the infinite the sum:

$\infty / \infty = 1$  and no matter if the mathematicians accept the existence of the infinite or not, here it is the simple fact that a mathematical entity divided by itself should always give 1 as a result. The infinities cancel out without a trace!

Beautiful, isn't it ?



Scary design showing the full-emptiness

### **Horror Vacui**

Let us now analyze the problem of physical logics. Why do individual atoms weigh more if they are alone and less when paired in molecules? For example a hydrogen atom H alone weighs more than a hydrogen atom paired to its twin to form the

molecule known as H<sub>2</sub>. The same applies to the oxygen atom O, that weighs more alone than paired to its twin to form the molecule O<sub>2</sub>.

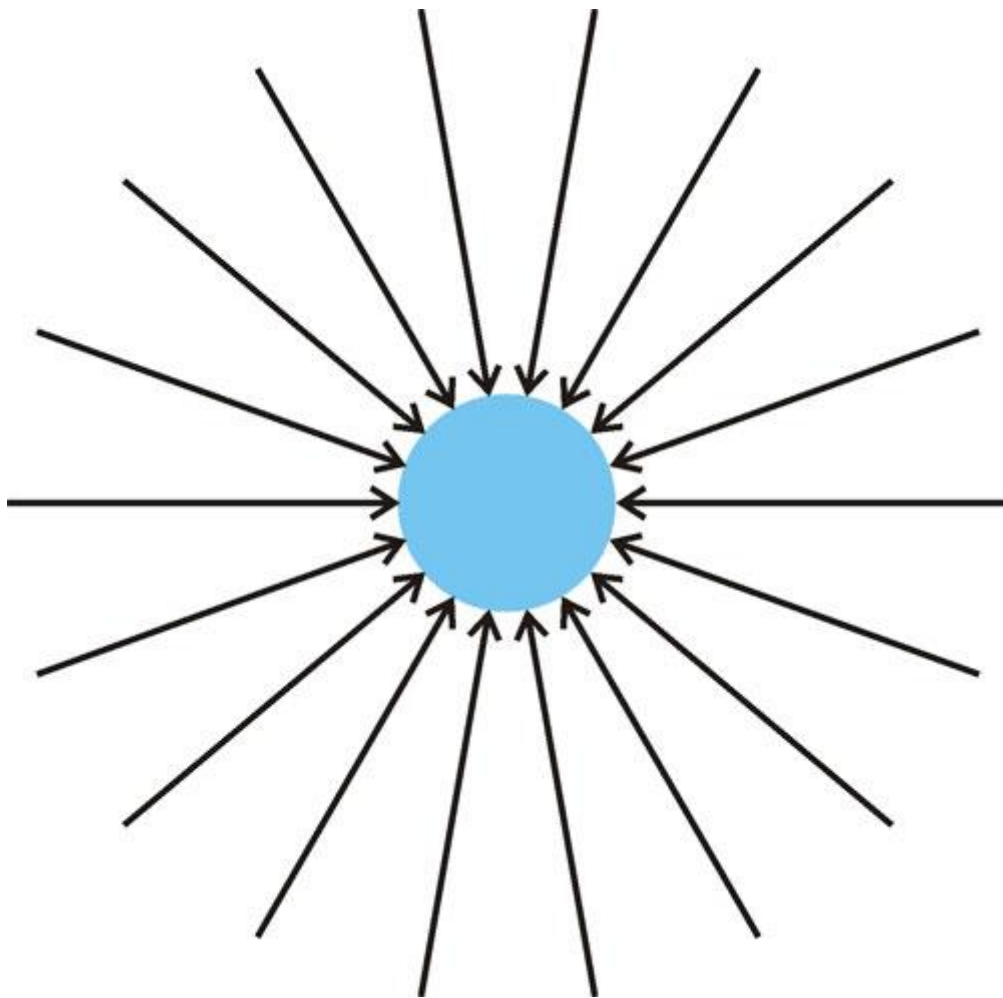
Odifreddi says that it's because the atoms are using a bit of their energy (which is equivalent to their mass) to bind to other atoms. Good up to here, but we remain stunned trying to figure it out. Why ? If I go hand in hand with my wife, I do not lose weight, otherwise I would try to go around always hand in hand with her ( I have to lose 18 kilos, by order of the doctor).

So what trick do the atoms do to lose weight? If we start from the simple premise that everything that exists is filling the vacuum of space-time, and that if it didn't fill it, space-time would be filled with vacuum, which can not exist, this physics problem would become easier to analyze and perhaps even to understand. The vacuum does not exist because there would otherwise be non-being, and by definition only what exists, is. The non-being, by definition, is not. That's enough !

We have said and shown in the Talmud of Scicli that space-time is full of infinite *logons*, atoms of space-time of zero size and zero mass, that fill it completely leaving no gaps and that they are the cause of the inertia of the infinite. It doesn't matter what are the *logons*, just think of physical entities that are in contact with each other without leaving gaps. The logons, each of which occupies the center of the infinite space-time, when are moved from their equilibrium position, exert a pressure on the body that moves them, which is called inertia. Einstein discovered that the inertia

is equivalent to gravity, and both are physical properties of space-time, but he forgot to tell us why.

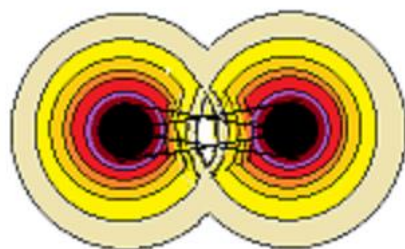
In the Talmud of Scicli we have assumed that the inertia was a pressure applied by the logons on massive bodies and therefore it's also an energy, which exerts a pressure on the bodies in the following manner:



In the case of a single atom, the pressure exerted on him by the inertial logons creates its gravitational mass and therefore its atomic weight. If the atoms are two (or more than two) and are

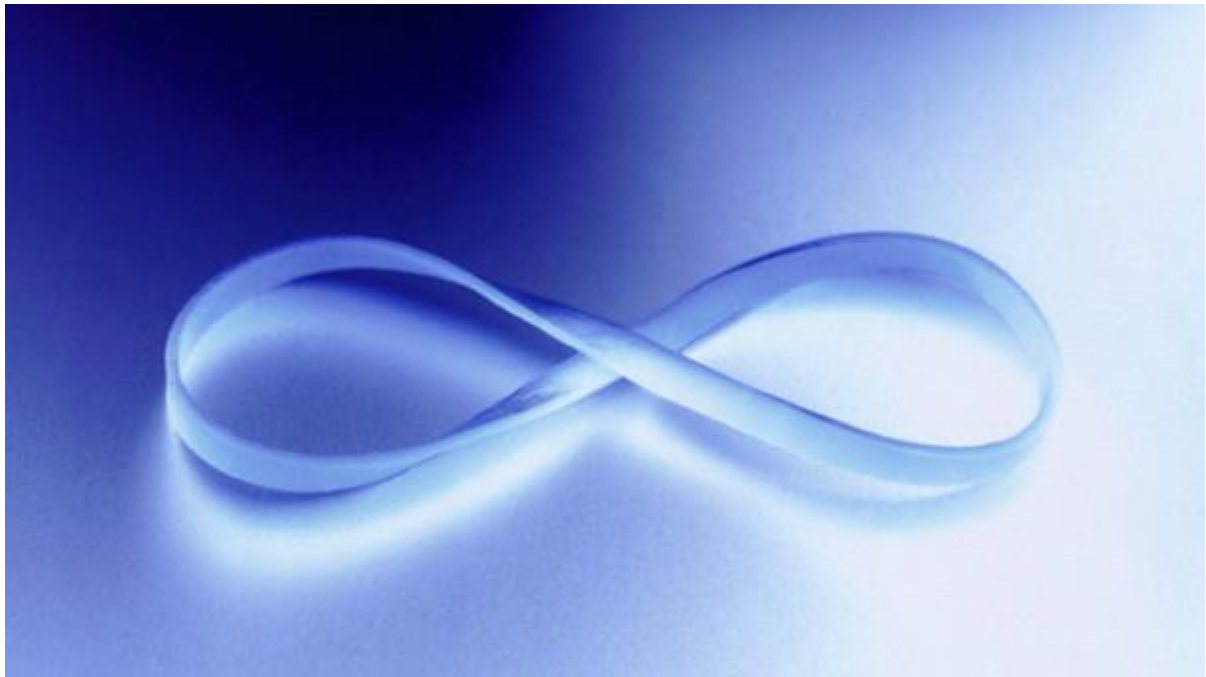


paired, the pressure exerted on one of them cancels out with that of the opposite sign exerted on the other, so between the two a vacuum is created and the two atoms are pasted one against the other, to avoid that vacuum, as illustrated schematically by the drawing below.



Since the mass of the atoms is due to their inertial pressure, if at the point of contact of the two atoms the pressure decreases, it will also decrease the mass and the two atoms will weigh less. In terms conforming to the theory expressed in the Talmud of Scicli, the two cones of certainty of the two atoms will cancel out when the atoms are in contact with each other.

Dear friends of the Academy of the Kabbalists, these phenomena have been explained to you before. He who has ears to hear, let him hear. Otherwise drink a nice grappa and do not worry about them, since the world goes on fine just the same.



### **Immutability of the Infinite**

We now that Leo could not remember more than three things at a time because he had discovered that this was a typical condition of the human nature that is typically three-dimensional ( but perhaps the situation was due to a beginning of rampant Alzheimer disease ). However, having finished the book of Piergiorgio Odifreddi, after long and painful overheating of his old brains, at least three things were left in his brains:

- 1- The story of Cesare Zavattini: "The math contest"
- 2- The description of Jorge Borges's Library of Babel
- 3- And the conclusion of the book where Odifreddi clearly said that the infinite does not change when you add one.

Let's see these three things to understand what Leo remembered of that big 400-page book entitled: The museum of Numbers.

## **The story of Cesare Zavattini**

The father of the narrator, never mentioned by name, but called Dad, had joined the math contest of Goettingen in December 1870. It was a Friday.

The math contest consisted in saying the greatest number and the participants in the competition were more than 20,000. After the janitor Pombo had fired the first cannon shot of the day, without anyone noticing that it was the cannon shot the day before, the race began in the presence of Prince Otto and a remarkable group of intellectuals. The competitors then began to recite the string of their numbers. At 19 hrs Alain from Sorbonne slumped exhausted and at 20 hrs the remaining survivors were only 7. At 21 Pombo lit the street lamps and the survivors had arrived at 40,721, when with a twist the algebraist Pull said: "One billion" and the mathematician Italian Binacchi said: "A billion billion billion." At this point Dad said: "A billion billion billion billion billion ..." until the chairman of the competition Maust, pale, tried to stop him, but Dad continued "billion billion billion .." until he collapsed exhausted in his chair after saying the last "billions ...".

At this point Prince Otto was about to hang on his chest the medal of victory, when Gianni Binacchi jumped out treacherously and said: "Plus one" and thus he won the race and was carried in triumph. Needless to say, that night my Dad, once he got home, regretted with his mother crying: "I could have said plus 2 and could have won..." "But the race was now lost.

Because of this beautiful tale of that wizard that was Cesare Zavattini, who in his life had told all kind of funny stories, Leo had understood the meaning of the story: you can count as long as you want, but to the number that you say you can always add 1 endlessly.

### **The Library of Babel**

Let's now see the second story of that other wizard who was Jorge Luis Borges. Leo some time ago had read the original story written by Borges, but he had already forgotten it long time ago, so it was good that Odifreddi had re-told it to him.

The story began with these words of Borges: "The Universe (which others call the Library) is composed of an indefinite and perhaps infinite number of hexagonal galleries, with ventilation shafts in the middle bordered with low railings ...."

That was enough for Leo to realize at a glance that that Universe described by Borges, which was crammed with books, could not represent the infinite, because the books had a size and Leo knew that the books had to be at most "n" . And at the end of that "n" one could always add + 1 and it became "n + 1". Over all it was the Universe and Leo knew that the Universe had a beginning with the Big Bang and therefore, however great, it could not be infinite, and therefore it could be filled with hexagons and books, even if it took a lot of time .There was no point in trying to compare the Library of Babel with the infinity.

## **The infinite does not change when you add 1**

Instead, what had said Odifreddi the end of the book had hit Leo as a possible truth: the infinite does not change when you add one.

Having read and understood the set theory of Cantor, Leo knew that you could add another infinite to the infinity without it to change: it was always an infinite. Even more so, you could add to it a simple 1 without changing it, because more than a number, the word infinite was a definition, similar to to the Hebrew *En Sof* (which meant *without limits*), definition what each man had very clearly in mind. It was a limit that defined something that never ended. It was an axiom: a truth accepted as true without the need for a demonstration. It was a truth that you had to accept on faith, without evidence, as the existence of God. If the infinite was a road, it could continue forever, without ever arriving at the end, then adding an additional kilometer, it would change nothing. If the infinite was a time, that is, if someone had said, "Wait here, I come after an infinite time." You could wait that someone forever, *per secula seculorum* and one more minute would not change anything. The infinite you could write with the sign  $\infty$ , that is, with a snake biting its tail, or with a race track without end that did not start nor ended and you could walk on it forever.

Leo was fascinated by the paradoxes of the unlimited and knew that the sound barrier was the extent to which the sound waves could be compressed, reducing them to zero. The light barrier "c" was the maximum speed at which could travel a particle with

mass, because at that speed the distance shortened until reaching zero and the time stretched up to become infinite. But what were the limits of infinity? Well! Just what had said its definition: it had no limits. It was the only entity that had no limits. How was that possible? What was there beyond it that limited it ? Nothing, just because it had no limits. Terrible!

### **The mystery revealed**

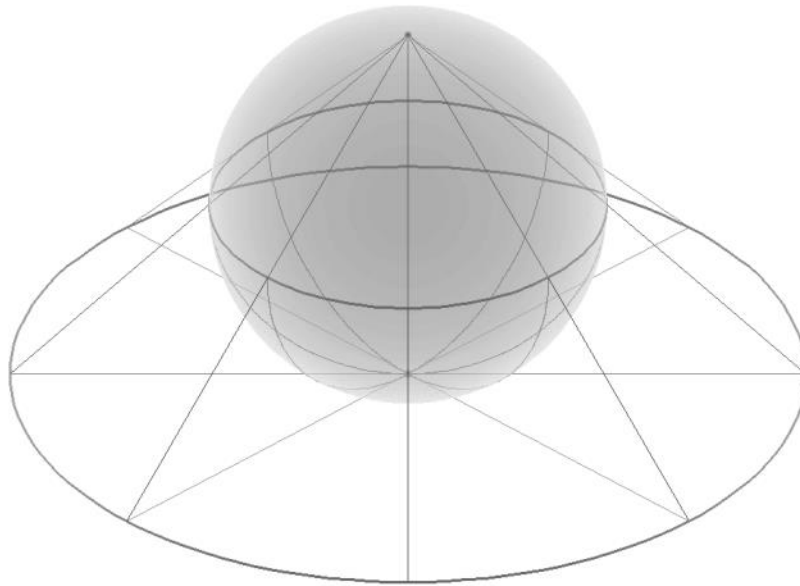
Here's how Leo, the Kabbalist, after a few hours had managed to unravel the mystery.

Starting from zero. It was necessary to resort to the zero, which was the source of everything and that was the greatest mathematical discovery of Leo that, because of his modesty, he had never published, except in his blog on Google. Even for the infinite, the zero was its limit and this was the demonstration.

Starting from zero, that is, from the *logon*, the dimensionless atom of space-time, one could come to 1, that was easier to understand than  $\infty$ , and that was the important mathematical discovery that Leo had made many years ago. Then from 1, with a geometric trick one could reconstruct the infinite starting from the sphere of Riemann and proceeding on the contrary of it (see description below). Leo had already given many times the proof that the sum of infinite atoms of space-time of dimension zero was equal to 1, it doesn't need to be repeated here.

Instead what is worth remembering is that that simple 1, is not only the unit but also the sum of all the *great infinite whole* that includes everything.

That 1 could also be geometrically demonstrated with the sphere of Rieman illustrated below which was also used by the great mathematician Rieman to describe the accumulation of infinite geometric points of space in one point.



In other words it is possible, using the sphere of Rieman, to accumulate the infinite geometric dimensionless points of space (points of zero dimension) only in one point, because the sum of infinite zero is equal to 1.

If the One included all, there was no need to add another 1. The limits of  $\infty$  now were more understandable. On the one hand there was the zero, which can be defined as the zero point of each event that has a meaning in space-time. All that occurs always starts from zero and then it occurs: first it doesn't exist and therefore is zero and then it exists and its probability to exist becomes 1, that is, certainty, which is the second limit of  $\infty$ .

So between 0 and 1 there are endless dimensionless points that create the infinite. No more an infinite without limits, but an infinite between 0 and 1, but also always infinite. An infinite easier to understand.

But the doubt had not disappeared altogether because there remained a big problem.

While 0 was always equal to itself with the sign + and -, the 1 despite being flexible and the sum of all the infinite 0 had a dual personality, and could be either +1 or -1. What was going on in an infinite that had for limit -1?

This is the world of the Devil. Dear friends of the Academy of the Kabbalists, this will be another story of Leo.