The differences

There is a nothing. How to explain that? How to explain nothing by something? I do not know. We can imagine an ideal point which dimension is 0. Anyway. Go on. What about a line. I mean the pure line without any changes, without any difference throught it. See Fig.1.

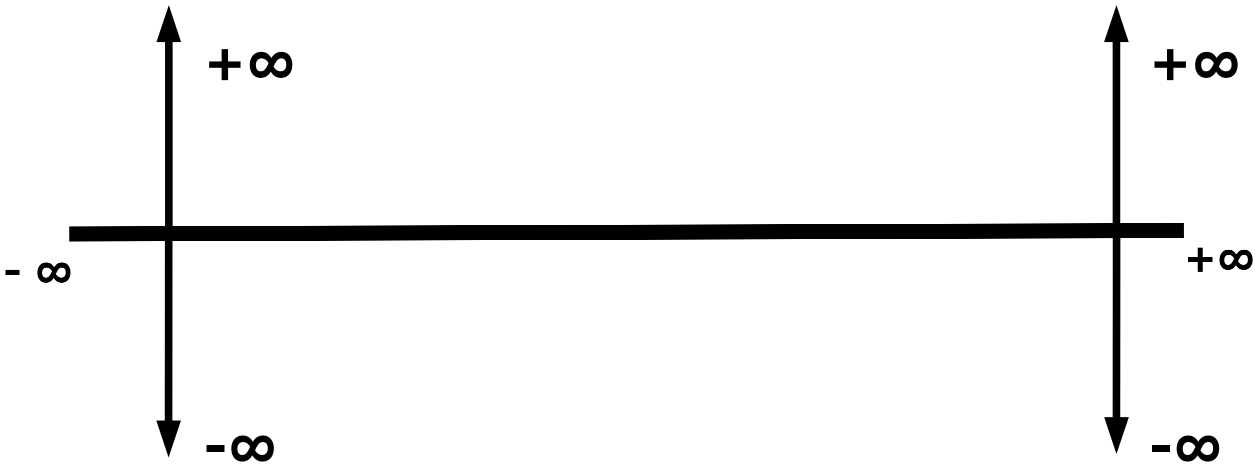

Fig. 1 – the pure line from infinity to infinity

What can we say about? The ideal line from infinity to infinity. Infinity is even on the sides of the line. There is no change, no difference, anything else what can we take out as the unit. See Fig 2.

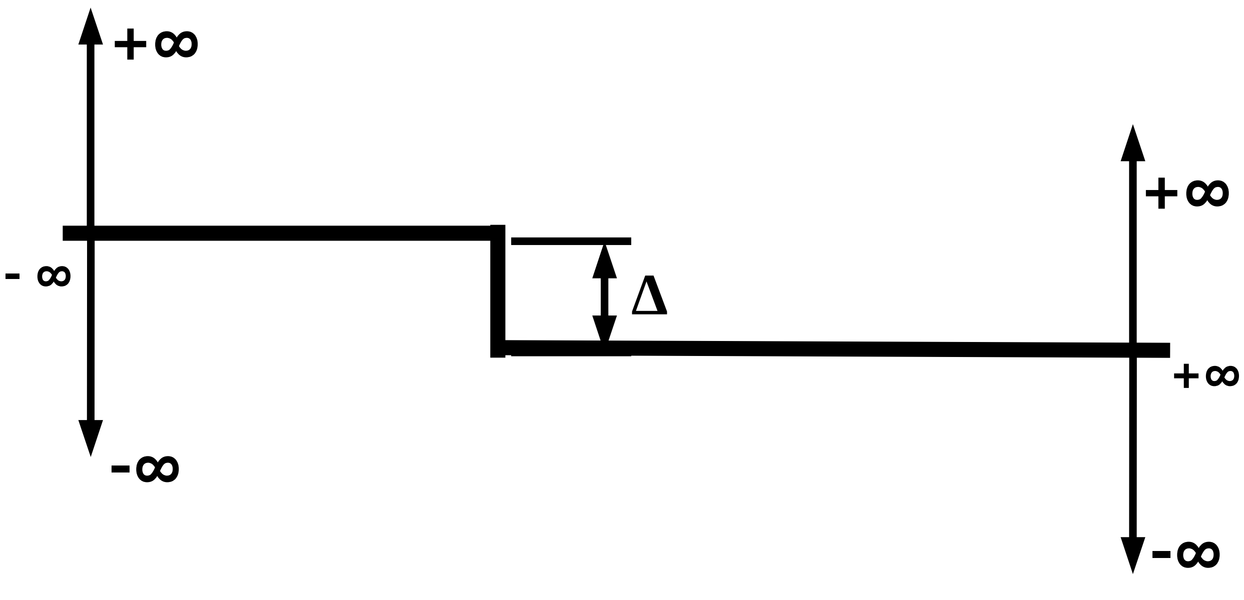

Fig. 2 – the broken line with one difference

In the Fig. 2 we see only a one change Δ. What is the dimension of the change Δ ? I don´t know. We can freely choose a value of such dimension. Probably, we use the number one. What is the meaning of the number 1? Nothing, we can use other numbers. Without next changes there is no meaning of the first change. We must have at least two changes. After that we can compare these changes. If they are no equal then we obtain a value called the **difference.**

To say precisely – the only one change has also the difference. The difference between the first part of the broken line to the second part of the broken line. But as I wrote above – there is no meaning of such difference. The infinity (to the sides of the broken line) remains the infinity regardless of the size of the difference. Only if the size will be great then 0 and less then the infinity.

After that we could give a lot of examples of changes which are different to each other. These changes are changing – in other words they are living through the time of our universe. See Fig.3. There are differences, differentiation. That's the world, the whole universe.

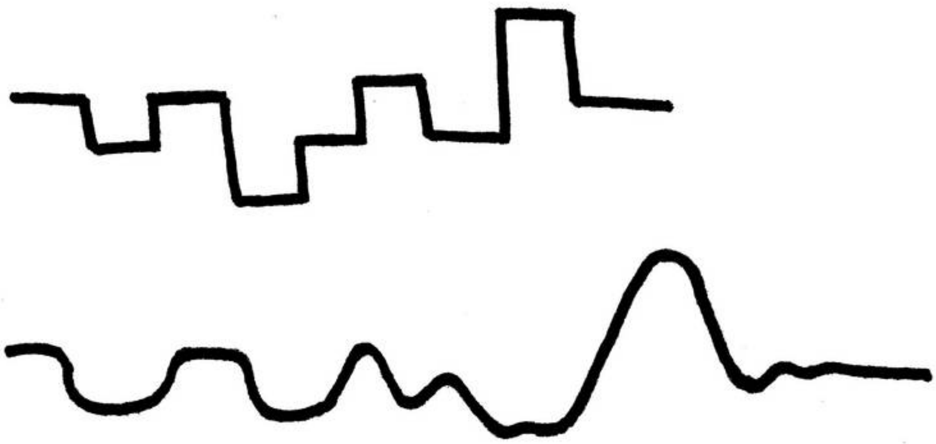

Fig. 3 – two kinds of irregular changes

And all science is dealing with given differences that change over time. How the potentials balance out, how all the changes in the differences happen. All mathematics, physics, chemistry, biology, geology, technology, philosophy and social sciences, art, craft and any other human endeavor are based on this. Differences or their changes, their course, have a certain logic, and the same logic is valid indefinitely.

Science deals with recognizing differences, classifying them according to common characteristic. In other words, before examining any differences, we must first sort them by common characteristics (colour, shapes, properties). Yes, we know e.g. every snowflake is an original but snowflakes have common charakteristic – a hexagonal system. And based on classification, science can predict future phenomena that can be experimentally verified. See Mendeleev periodic table of elements, Dirac's positron prediction, Einstein's prediction of the impact of gravity on light and much more.

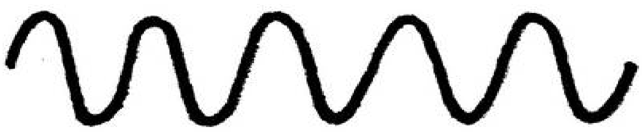

Fig. 4 – the regular changes (the frequency)

How to recognize changes? How to measure the changes? We need some ideally regular changes (the frequency) as a base unit. And such ideal frequency is ideal only in our minds as an ideal line or an ideal point.

What about the entropy of changes? The entropy of the initial state and the entropy of the final state. Differences between an open system and a closed system. How entropy is flushed out of the open system.

How to measure changes? How do you compare one change to another? We have an ocean of different changes in the universe. Some are very different and some are almost the same (distinguishable to the micro level).

Chaos is characterised by changes that are almost exactly (infinitely) similar. In short, there are no major or minor changes between them. Whereas in the universe there are background changes (fields of vacuum fluctuations) that are infinitesimally similar to each other. And inside this field there are changes (wavelengths, pilot waves, etc.) very very different. How to measure different sizes? You must first select a base unit. Some change that becomes a base standard and we assume below that it will be unchanging. Which will be difficult to realize - different gravitational accelerations in different places, influence of surrounding bodies (on Earth, for example, influence of the moon) etc. So we introduce the assumption that these effects will be negligible.

Now, we have a standard for measuring time, and that's the oscillations of the Cesium-133 atom.

Summary - We need to have one basic change to describe all the other changes. These changes must be different. But how big is one change absolutely? Regardless of the other changes? This query is pointless! First there has to be a change and someone (a person made up of a lot of changes) who chooses one change from the surroundings and this will measure the surrounding changes including changes of himself. The question mark is where the changes come from, how they came about, how long they will last. For change has its beginning and its end. Otherwise it wouldn't be a change! See the wave pattern, up and down, up again and, to everyone's surprise, down again.

It's not enough just to have changes. Changes to what? We can't answer yet. Back to change. It's not enough just to have changes. We must also have the characteristics of changes. We know that changes tend to level off, to average to their original smooth or almost smooth state. See water level difference. Or gases in thermodynamics. Even better, a physical field with quantum vacuum fluctuations that we can compare to 100% chaos. The degree of orderliness is determined by a variable called entropy. All physics describes the behavior of changes, using clearly defined fundamental change that serve as base unit for further description and sorting of recognized facts. Based on known facts, physics predicts new facts. But physics can't explain the origin of changes. He can describe them, sort them, base them on describing new facts and verifying them, but he can't explain the nature of the changes. This is indescribable by purely physical means. For physics depends on the change. And asking what was before the change, or what is the cause of the change, is a physically meaningless question. Just like asking how long it takes to flicker one of Cesio's atomic clocks. The answer is clear, one oscillation takes exactly 1 oscillation. We can copy it in seconds, but the second comes from a certain number of oscillations. Or ask what the mass of one Platinum atom is. The mass of 1 platinum atom is equal to 1 platinum atom and nothing more. And then we might add that there are proportionally lighter and heavier atomic elements.

Back to change. Now we know that we choose one change (or a certain number of changes) to measure other changes. It is clear that every change has a beginning and and the end. It is therefore limited. At the same time, any change must be of a certain size within a given constraint. It is not possible to have zero, therefore no size. That change doesn't exist. So is infinite. That change doesn't exist either. That leaves us with the appropriate size of change, which is difficult to define when we do not have a reference point or a reference change. So you need to have more than one change. At least two changes. Or quadrillions of different changes. It doesn't matter. Only then can we determine mutual differences or circumstances.

For the energy is but a difference only. There's no point in talking about energy on the same level. To what? Where is the reference point? The same is valid for the matter, for the space, for the frequency, for the time, for the intensity, for anything else.

There is no attack against the law of conservation energy. On the contrary, it is a confirmation of the law of conservation of energy. Confirmation of the law maintaining the difference (changes) of the original energy levels.

We see $E = mc^2$ We could know the energy of one atom or the whole energy of our universe! But we only know the energy of one atom is a ration to the base atom (Hydrogenium or Carboneum). How many atoms are in our universe then thera are such amount of the energy.

If there is nothing in the beginning then where does the something come from? What does it mean?

Let's go back to the beginning (of this chapter), where there was an ideal line in Figure 1. Now we show the ideal state without all changes a little differently. As ideally a smooth level of energy states with a height level of 0. The downward direction is less than zero (negative) and is fully occupied (black). The upward direction is greater than zero (positive) and is empty (white). See Figure 5. There is no change. Everything is calm.

Fig. 5 – the pure line of an ideal ocean of vacuum fluctuations

Once again, we have an ocean of energy levels, but no longer empty. In the positive area of energy states, the particles are in different energy positions. These are particles plucked from a certain depth below the surface of the energy states - that's why they're marked in black. In the negative area of energy states, on the other hand, there are antiparticles (empty places after particles are torn out - marked white). See Figure 6.

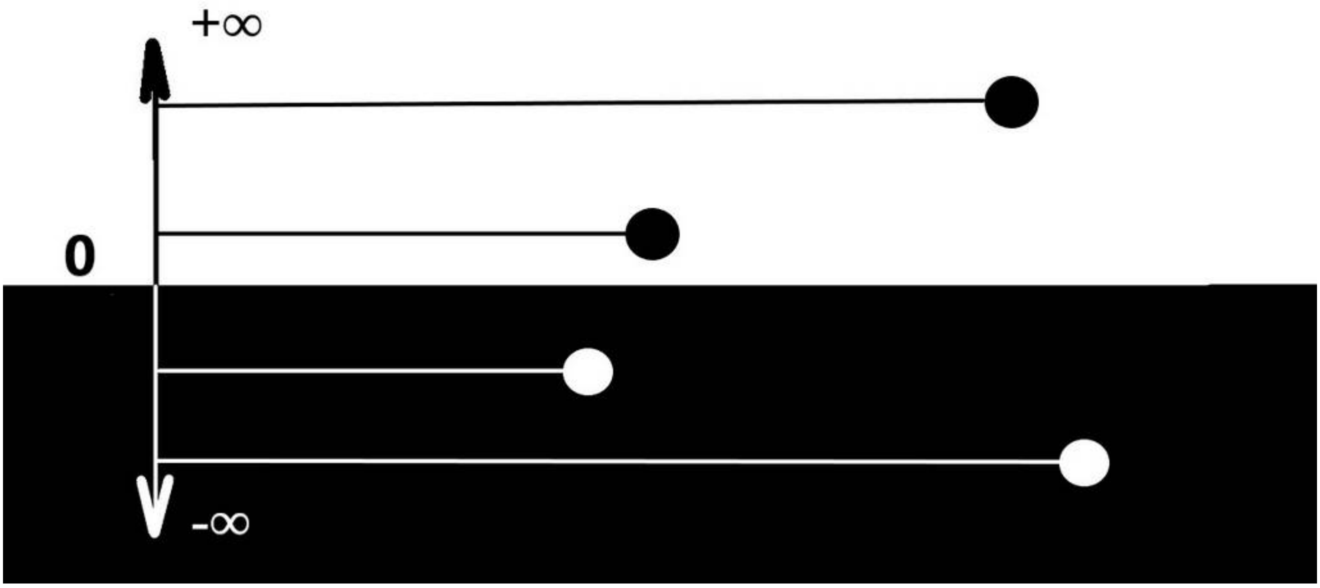

Fig. 6 – the pure line of an ideal ocean of vacuum fluctuations with particles and antiparticles

Go on. There are many particles and antiparticles. Completely detached or still associated with the original surface. These changes continue to arise and disappear, interacting with particles and antiparticles.

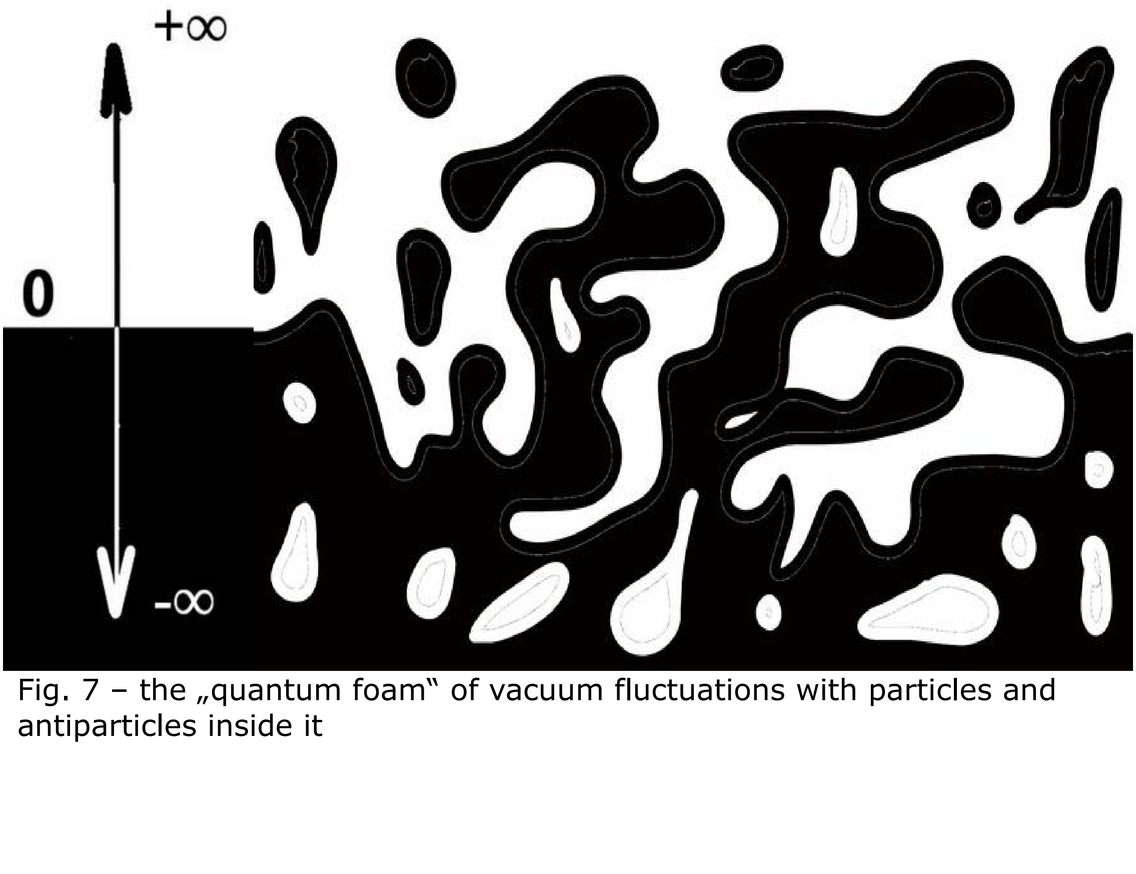

Fig. 7 – the „quantum foam" of vacuum fluctuations with particles and antiparticles inside it

Behold, we have a space-time quantum foam of vacuum oscillations. The fill of our expanding universe. What is the energy of our universe? I mean the average energy. I supppose the average energy is equal to 0 (read more).

Back to changes. Matter can't be lost, it can only be transformed. From one kind to another. So changes (differences) can't be lost, they can only be transformed into other changes. The law of conservation changes. In the beginning we have a big change, which over time will fragment into many different sizes of small changes. In other words, many small changes cannot spontaneously produce the original big change. See the second law of thermodynamic. It's also good to note that change couldn't have happened on its own. First there was a big change, after that there were changes, then a language that somehow named them, and then there was mathematics that counted the named changes (sets). Mathematics cannot explain the origin of changes. The same applies to physics, biology, chemistry, etc. I am so sorry for the fact the people are changes also. They have their beginning and their end. And the language that gives changes names is a demostration of human development. And language is a set of marks (changes) by which we express changes in the world around us and inside us.

It is good also to mention the difference in changes. Changes are potential and realized. See a potter having the idea of a new pot and after that the pot is realized (made), or a mechanical engineer having the idea of a new machine in his head. After that nothing happened. It is a question if the idea will be implemented in the real world. We can't see inside the potter's head, so we don't know what's going to happen, whether it's a container or a vase or a mug or something else - we won't know until after time. An embryo in biology - at the beginning we do not know (by mere observation) whether an animal embryo becomes a mosquito, a camel or a human. You can only tell by further dividing the germ cells.

Back to changes. One selected change serves as the base unit for other changes. The change must have the beginning and the end. The change has two basic characteristics - duration (frequency) and size (amplitude). It is valid for regularly changes as ELMG frequencies. See Fig. 8.

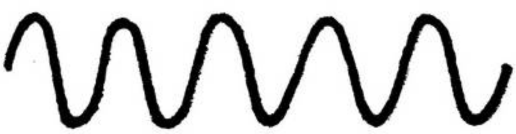

Fig. 8 – regular changes

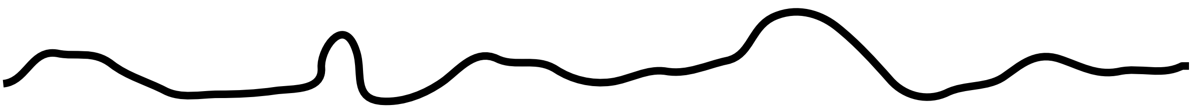

Fig. 9 – irregular changes

What about such irregular changes – See Fig.9. How to measure these changes? Where's the reference point? How to measure the time in the space without regular oscillations? We have our irregular progresses of changes. The question is how to measure it. What is the base unit for such changes?

The second question where is an average value of a 0. We must go to infinity tu recognize the right value. As we know this is impossible. The same way how to recognise the right conditions in probabilistic circumstances.

A very important question - how the universe came to exist. The most significant model claims nothing. In the beginning there was nothing - no change - only a flat and empty zero. How could anything come out of nothing? Or else, how could no change have resulted in change, or even a lot of changes? Explanation follows - the laws of physics require the existence of both positive and negative energy. In other words, the Big Bang produced a tremendous amount of positive energy and the same amount of negative energy. After averaging, we get zero again. What represents positive and negative energy? The positive energy means the energy of matter (particles, atoms, photons, etc.) and negative energy means the energy of space - the gravitational action of myriad galaxies composed of positive energy. Another question, what was before creation? The inquiry is not as meaningless as it may seem. It is good to realize that time as we understand it was created at the same time as the creation of the universe (that is, changes). Above all, it is good to add that time means regular changes. Yes, regular. Hard to define time using irregular (random) rhythms. And here is the essence of the answer. Time itself (regular changes - frequency) was created simultaneously with the creation of the universe. And talking what was before is nonsense. There were no frequencies (changes) before. But within the framework of consistency, we have to add that there is also a Permanence or better to write an Infinity Presence. What is the Presence, especially infinity? Hard to describe (still the same, and still in different forms, still recovering, self-similar, etc.) but let's think of the Presence as irregular changes - random to us. See the picture below.

Fig. 10 – Presence - indescribable, indefinable, in many forms

We can't describe the Presence. What a foolish human desire to describe the Infinity by using finite elements. Surely we have framework laws (thermodynamics, species and processes in biology, etc.), some approximation of framework expressions against the background of absolute chaos. What are these framework expressions? Maybe a flower - violet or daisy. It is impossible to describe daisy, precisely in the form of a mathematical function to express petals. We can't even weigh it exactly - evaporating the scent.

I am sure none of us have seen an ideal line or the ideal function in the nature around us.

But I think everyone recognizes a daisy. And most of all, daisies change. First there's no daisy (only chaotic moving molecules) , then there's a fetus, then there's something distant from daisy, then there's daisy, then there's something dried, after that there's nothing. To say better there is again a chaotic moving of molecules of a dust in the end.

Finally, I can mention the changes according to their distribution. Changes are potential and changes are realized. Potential changes may be realized. See plant seeds - they don't all come. The realized changes made are clear, they simply have existed for some unequal period of time.

About that in the next chapter.