# Non-geometrical Approach to Build Gravitation Theories.

Indefinite formative systems and a difference in approaches to build gravitation theories in indefinite systems as opposed to geometrical theories. A definition of indefinite formative systems. The structure of geometrical relations in indefinite systems. The evolutionary principle of indefinite formative system change. Linearity of physical spaces.

Let's examine geometry-related gravitation theories. The first to consider is Newton's theory, as a purely mechanical one. There are bodies in a space, they attract one another, just because the Creator decided so (no explanation of attraction is presented), the interactions are instantaneous. But these bodies do exist in some space point, i.e. there is first a geometrical system to be taken into account. Then come the ether theories which also presuppose a place of action, a certain space where the ether is distributed. The relativity theory of A. Einstein is the one dealing with a change in that place of action, i.e. it takes into account distortions of the space metrics, which depend on some conditions, be they the velocity of the body, or the existence of the gravitating mass; nevertheless, the geometrical paradigm is still there. All theories of gravitation appearing nowadays also include the geometrical space to place in strings, or branes (in the case of the string/membrane theory), or whatever it might be. The mathematical apparatus here is built on certain abstractions like the number set which presupposes some mathematical operations, this number set is simply being "glued" onto space parameters. It is implied that the place of action is well described with that abstract number set. Such an approach is called a field one, meaning that all definitions proceed from the pre-condition of a numeric field (scalar, vector, or tensorial values). Such an approach cannot be correct if one strives to build a most general gravitation theory. Any reasons to prove that have not been analyzed previously, though they are evident enough if one studies the numerical properties attached to the real space.

Properties of all numbers and number sequences considered by modern mathematics are specified by our physical space. That is why one should not hope to build a gravitation theory as a space change expressed by the numbers under consideration. Our numbers belong only to our Universe and to no other space whatsoever. Let's consider some basic and evident constructs in the terms of numbers. For example, the square of an object expressed by the formula:

$$2*2=4$$

This self-evident fact is not analyzed here as it directly follows from the properties of real squares existing only in our Universe, but in no other universe. We mean to say that mathematical foundations belong only to this world with low velocities and far from the regions with constantly changing conditions, which is attested by the existence of strong fields. Our conditions correspond to the Euclidean coordinate system considered to be "straight" and differing from curved spaces, or surfaces. Let's assume there exists a world whose major squares may be expressed like that:

$$2*2=16$$

From our world onlooker's the point of view this ought to be a highly curved space, still from the point of view of an eventual inhabitant of that world this is the only possible "straight" system of coordinates, in fact their "Euclidean space". Inhabitants of that world transform it in accordance with their own coordinate system. What is more, it is our world that looks flat to them.

Visually it would be difficult to imagine the world conforming to the condition of:

$$2*2=2$$

Still, such a case may exist. Our world is to be represented as a space with a certain degree of curvature and that latter may be either larger or smaller than that postulated in the Euclidean geometry.

In accordance with the constants 1, 2, 3 any numerical sequence of the worlds corresponding to a degree of the "space curvature" is different. Here we want to point out an inconsistency of the standard geometrical approach in formation a generalized gravitation theory. To this point, there appears an additional discrepancy in the integration and differentiation rules applied to changing worlds. That is, if a world is contracting or widening, the geometrical space function depends on a certain exponentiated constant which expresses time but does not depend on that time directly. This is to be understood that aggregation of integrals renders itself incorrect, i.e., the sum of small values, viewed from this point, is not equal to a larger value.

Besides the mathematical insufficiency for building up a general theory, there is also a lack of the notion termed appearance or manifestation of geometrical relations, in short, we live in the world conceived as geometrical, still what do we do with space gaps?

All these discrepancies may be eliminated by introducing a notion of a forming system.

An indefinite forming system is a certain object the essence and type of which are not definite (hence the term). This may be anything – a table, a building, a cup, wind or wave movement, reflected light on the wall, a PC or just a database on one. It may well be a program , or a book, or a living being. In fact, any material or ethereal object, even the one we are unlikely to imagine.

There are two conditions postulated of such an object:
1.      the object exists
2.      the object undergoes change

To facilitate the comprehension, we shall choose a system consisting of communicating vessels, one of which has been filled with a liquid. The vessels shall be marked "S" and "T". The liquid from "S" shall be spilling over to "T". Liquid levels in the vessels shall be marked as "s" and "t" respectively. See Fig. 1 for the system status change, the liquid spill-over.

Figure 1
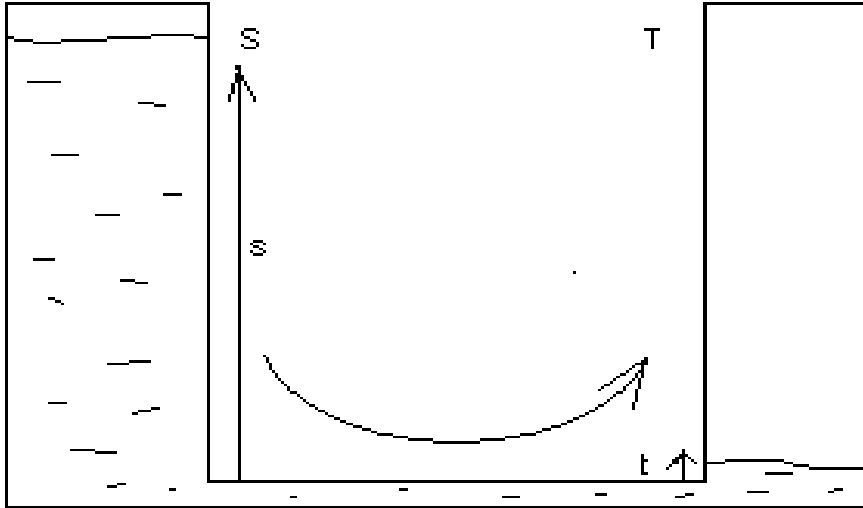


We shall have several correlations between "s" and "t" in the course of the liquid spill-over, let's take some, as an example:
1) S=10, T=0
2) S=9, T=1
3) S=5, T=5
4) S=0, T=10

Now let's consider their interrelations for certain moments :
"1", - S/T= ∞
"2", - S/T= 9
"3", - S/T= 1
"4", - S/T= 0

It is easy to notice that in the course of the liquid spillover the interrelation between S and T is changing from infinity to zero. The value given is the one called a universe forming value.

The attribute "forming" is used because this value participates in forming a universe, and its geometry in particular. A remark here – neither the space in which the present system exists nor its time rate play any role for the forming value. One can easily change the time rate in which the system "lives" or temporarily stop the time, the S/T correlation expresses the ratio, in our case the relative height to which the vessels are filled. Another forming value expresses a percentage of the vessel fill-up, it is also independent of the time in which the given system finds itself. The $S/T^2$ value is a change of the time rate with which the process proceeds. That is, the fact that in the course of the liquid spill-over the percentages of S and T change means the same as the process proceeding from infinity to zero.

One should bear in mind the parameters of the changing system which includes by itself two values responsible further on for the appearance and later evolution of the space in our Universe, they are S/T and $S/T^2$.

For our world the values would be like follows:

$$\frac{S^2}{T^2}$$ – **gravity potential**

$$\frac{S}{T^2}$$ - **intensity of the gravity field**

These values are the forming ones, it is they that form the space of our Universe. The geometrical dimensions of the space in the Universe depend on the ratio, i.e. the interrelation of these values.

Here lies the difference from the classical world outlook as a container for every being and from such world understanding as the observed by us representation of real events in the Universe. Movement is primary, the coordination system is secondary.

The founders of the integral and differential calculus, Newton, Leibnitz and others, thought the relation of S/T as a derived quantity for the movement of S in the course of time T. Movement in the mechanical frame (the same concerns the relativity theory, the theory of strings, the brane theory and the like) is a derivative, a kind of final summary of the body behaviour in a certain geometrical system, one differentiates only parameters and a type of system which in fact play no significant role. Everything comes in the final run to the integral calculus determined by a body behaviour in space.

In the gravics which uses the concept of an indefinite forming system, S/T is a primary notion, "s" and "t" being derivatives from the system status.

In this forming system, S and T may mean colour, shape, size, temperature and what not. It is of no meaning what this parameter may be like. At that, (S/T)2 = (s/t)2, i.e., the value correlation, acquires the meaning of the gravity potential in our world. Despite the fact that S does not mean s, nor T means t.

The geometrical size of our world is a derivative from the correlation of the forming parameters.

The size of our world is no longer connected with S and T parameters, a forming system, but is related only to the correlation of the forming values:

$$\frac{\dfrac{S^2}{T^2}}{\dfrac{S}{T^2}} = s$$

For our world one of the forming values looks as follows :

$$C = \sqrt{\frac{S^2}{T^2}}$$

The light velocity. Another value is that of the intensity of the gravity field in the Universe.

$$G = \frac{S}{T^2}$$

That is, a change in the light velocity (its decrease), in our model it is the diminishment of the liquid level in vessel 1 as to that in vessel 2.

**S/T** and **s/t** have similar values in the forming system world as well as in our world. Still, **s** and **t** in our world are in no way dependent on **S** and **T** in the worlds of the forming system.

The forming system world does not bear any meaning for ours, nor our world for the system world as a whole.

To construct a cosmological picture of our Universe, we shall introduce the concept of the evolutionary principle. It is based on the change in forming parameters of an indefinite system. Without understanding this principle one cannot conceive building of a non-geometrical gravity theory.

The philosophical problems have always been the ones of what is primary – matter or consciousness, the egg or the hen. We shall formulate the evolutionary development principle.

Let's take for example, the organism development and assume that there is an egg which develops into a hen. The problem to solve is in what a grown organism differs from an egg and what makes them similar.

The organism which comes first in our train of thoughts, the egg, is an elementary one, absolute and perfect, it is symmetrical and does not possess a structure, i.e. the wholeness consists of one cell. However, a grown up organism, for example a hen, is not that symmetrical – a tail in the back, a beak in the front, wings at the sides. Contrary to the egg, it is of a sophisticated structure, i.e. it possesses a great quantity of highly specialized cells. The cells of a grown-up organism are not self-sufficient and cannot exist separately.

How do such transforms occur? They say that the organism grows up but this word reflects only a superficial view. The organism develops without having a goal of growth being the major factor; the main feature here is the transformation or change. When one sees the title of our theory, the first thing to come to the mind of a person seeing the development as growth (typical of a geometrical approach to the world) should be the vision a deflecting balloon. However, my title points only to the processes that cause gravitation. Geometrical dimensions can be unchangeable or can even be increasing.

So the organism is changing, it is not seizing any additional parts from the outside, the egg does not glue wings and a tail to itself. The simplest organism becomes complicated in its structure. First it divides into two cells, thus becoming a complex one as it starts to consist of two structural units that differ a bit from one another. Then the sophistication proceeds by cells dividing and becoming specialized. Still it is just the same organism as it used to be in the form of one cell.

The organism development formula does not lie in a mechanical growth of its dimensions but in a sophistication of its structure.

Both the living organism development and the development of the universe proceed in this way. We conceive the status of the primary universe as super dense and then we are confronted with an explosion widening this compressed system, from a geometrical point of view. In accordance with the evolutionary philosophy our Universe once changed its internal status and has been going on changing it. The size of the primary universe is equal to the size of the Universe we are having now. This means that any structural unit of a given universe is much smaller than the size of a primary "cell", though the latter is understood by us as a super small and super dense unity. A philosophy linked to a geometrical world outlook, including the relativity theory, the brane model and the like, treats such facts as paradoxes not to be comprehended, as it suffices to have some general equations. The physical picture concept of the world is substituted here by an ease of mathematical manipulation. It is presupposed that the theory is best understood by those who produce these mathematics most perfectly.

Conclusion

The above enables researching a new type of gravitation theories with the metrics formed as a result of a change in a certain system. The theories built on this approach are evolutionary and non-static, an opposite to those dealing with some stable metrics. A static theory is just a particular instance of an evolutionary one.

One of the non-linear gravitation theories is a universe compression theory.