

Inside Outside Equivalence in Mathematics and Physics

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Abstract

We go on considering mathematics as reference system of life introduced in preprint article (1) **Zeps, Dainis**. *Mathematics as Reference System of Life: preliminary observations*. Riga : Internet publication, 2009. We introduce principle of equivalence of inside and outside but in some physical sense. We use work of Rudolf Steiner (2) **Steiner, Rudolf**. *The Dead are with us* : R. Steiner press, 2006.

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Introduction

In articles (1; 3; 4; 5) we tried to introduce concept of reference system of life. In advancing series of unpublished papers (6; 7; 8; 9; 10; 11; 12; 13; 14) we have developed this idea. Now we try to introduce some principle which could help to join more clearly two seemingly distouched subjects, life principle and mathematics. We call it *inside outside equivalence* principle. What would this mean?

Most brief explanation would be to say that we live in reference system from within where there is outside too, but crucial aspect is that we should depart from two notions, namely, inside/outside, in favor of one common. Mathematics know Möbius transform type applications and all of them mathematically embody as if the same idea: inside outside union in something "one". Let us be more specific about what we mean behind this. For this reason we consider one version of Möbius transform, namely, Riemann sphere and, specifically, with application to heavenly sphere, see (15; 16).

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Heavenly sphere

Heavenly sphere in relativistic approach may be treated as Riemann sphere where point “in heaven” would be consisting from two values, u and v , or one value u/v , where u is distance from our eye to star (using one pole) but v – the same (using other pole) in Riemann sphere; in plane would correspond similar distances from centre and infinite far point. All heavenly sphere we could imagine be as if (differently) distant starts, and heavenly “firmament” behind, consisting from “infinite many” infinite far points which mathematically, in Riemann geometry, should be one single point, but infinite far point (or infinite many points?) in plane representation. Möbius transform u/v says that both points, that of eye and infinite far point, or their representants, u and v , are equivalent, i.e., interchangeable.

That is what mathematics would say. Let us enter here physics. But not in standard outlook but that what we need for our life principle and mathematics of it behind. We say that there are not two distinct things, eye and infinite “heavenly firmament” but they are one and the same thing that falls apart into two in the reference system of life. Life itself would “live” in this common essence of two as if distinct states. Mathematically, this would mean that there are not two points on Riemann sphere, two poles, but one common entity that would be represented with two distinct poles. Physically we would think that reality is this common state quality but their subdivision into two states is some representation of reality which take place when life accident emerges in the reference system of life. Thus, we have come to principle of equivalence of these two points, and the equivalence of “point of eye” and “heavenly firmament”. We would like to call it inside outside equivalence principle. Why? Because this equivalence would mean just this simple thing: life does not distinguish inside, i.e., behind eye, from outside, behind “heavenly firmament”. This distinction arises only when life accident comes into existence, which would see “things around” only from within reference system of life. The “things around” space would be generated by distouching two points, infinite far from “centre of locality”.

We would like to state that mathematically there does not occur anything specifically. Of course, mathematics only fixes static states, invariants and so on. All where something “occurs” is physics. Mathematics is only that thing what nicely confirms with this physical reality.

Outside inside equivalence

Mathematically this is always true because mathematics can't be “interested” for some distinct side to be more preferable than other side. But for physics it is of crucial significance. Let us search for examples of this. Of course, classically we may be only inside some specified locality or outside, not like “Schrödinger cat” in two states in the same time. In quantum world we see electrons behaving “weirdly” having two states of opposite spine. Electron as if exists (from point of view of our reference system) in two states but measured appears to be in one specific. But let us say that these states are actually some “hypostases” of one actual state. What allows us to think so? Let us look for analogy in macroscopic world from some spacial point of view and look on two symmetries, $SO(3)$ and $SU(2)$. They differ only in that $SU(2)$ is “two times as big”. But let us think that one side correspond to some

“in” state and other to “out” state. We, in our reference system, “see” only one side, “in” side, namely, SO(3), space, other side, “outer” side, being visible only from “somewhere outside there”. But actually, using our outside-inside equivalence principle, these both sides are the same reality, where life uses to live itself or herself, but our life accidents live only “inside”.

Let us illustrate this space “two-sidedness” from electron spine weirdness point of view. Let us take tesseract, analog of cube in four dimensions, and represent it in 3-space in faithful symmetric way as rotating torus. It may be rotated (invariantly to spacial directions) in two ways, left wise, and right wise, and thus acquires two state quality as electron does. Tesseract in SO(3) “lives” in two states, left-rotating, and right-rotating. But from our (life in general) point of view, these states are the same one state. Two distinct states are for reference system of life for us or our life accident, but one (common) state – for life itself/herself. Two sides are not only equivalent, i.e., interchangeable, but they constitute something common. We call it *inside outside equivalence*. But not that only they are interchangeable, but they are interchangeable for the life living inside. Thus, not only mathematically, but for life, outside and inside are the same “common area”.

Reference to Rudolf Steiner

We are indebted to refer to Rudolf Steiner who may be named as discoverer of this principle. In (2) he pointed at what is outside should be considered otherwise. But, alas, he did it so vaguely that it couldn't be taken as something for working idea. More specific he maybe is in this quotation:

On the earth we know the animal kingdom only from outside. The most external activity of the life between life-in-past and a new birth consists in acquiring a more and more intimate and exact knowledge of the animal world.

In the same lecture he is speaking about state between lifes, and here he is more specific, speaking about mathematically visualizable picture that sees person in the state between states of being alive. Person is somewhat active in forming his future “mathematical state”. He says:

For in this life between life-in-past and a new birth we must prepare all those forces which, working in from the Cosmos, organize our own body. In the physical world we know nothing of these forces. Between life-in-past and a new birth we know that our body, down to its smallest particles, is formed out of the Cosmos. For we ourselves prepare this physical body, bringing together in it the whole of animal nature; we ourselves build it.

Even more:

Everything that takes shape in the egg is an imprint of cosmic forces and the hen herself is only a place, an abode, in which the Cosmos, the whole World-System, is working in this way.

And more:

Between life-in-past and a new birth, in communion with Beings of the higher Hierarchies, a man is working at this whole system of forces permeating the Cosmos. For between life-in-past and a new birth he is not inactive; he is perpetually at work—in the Spiritual. The animal kingdom is the first realm with which he makes acquaintance, and in the following way:—If he commits some error he immediately becomes aware of pain, of suffering, in the environment; if he does something right, he becomes aware of pleasure, of joy, in the environment. He works on and on, calling forth pleasure or pain, until finally the soul-nature is such that it can descend and unite with what will live on earth as a physical body. The being of soul could never descend if it had not itself worked at the physical form.

What he is speaking about? We may now clarify what should be hidden behind words of Rudolf Steiner.

Unfolding and folding up of accidentance of life

Let us be more hypothetic in this subsection and try to speak way Steiner was used to. When a person dies, he/she, in reference system of life, moves away from state of behind divided into two substates of inner/outer to the common state of inner/outer. In the same time life behind this act of dying performs some folding-up of functionality of life for this accidentance. This person experiences “physically” seeing movement “along tunnel towards light”. When person is born, it should experience reverse process, i.e., that of unfolding of functionality of life. What these foldings up and unfoldings mean? If Steiner is true, and we now are more than certain about this, this functionality unfolds and reversely folds up in purely mathematical way. Steiner’s World System would be functionality of life in our terminology. Steiner’s reference to all forces of universe at work at all stages here gives us right to speak about functionality of life on all stages, and more over, that this functionality is one general principle that would not work on different levels using different laws.

Some physical aspects of functionality of life as mathematical framework

Most important discovery leading us towards recognizing of mathematics as reference of life is quantum mechanics. We may point out one very important aspect of eventual development of physical science in this direction. We need to perform some principal steps in understanding of general principles of equivalence. First would be *particle wave* equivalence on what all quantum mechanics reside. Second we would try to nominate *particle space equivalence*. And then comes third, *inside outside equivalence* principle. These three should suffice to some quite new state of contemporary physics. We would express these arguments in some equation like way stating:

$$\text{particle} = \text{wave}, \quad (1)$$

$$\text{particle} = \text{space}, \quad (2)$$

inside = outside .

(3)

We guess that physics may would develop itself just in this way if not quite using the same interpretations as our, but after some time we could reach some common or at least similar point.

What is reality?

What reality should be taken in case we came to principles of reference system of life and inside outside equivalence? We see all via “eyes” of life and via “eyes” of mathematics in the same identical way where mathematics stands for functionality of life. Somewhere behind this reference maybe is actual “matter” or what may be called matter that is independent from life, but we do not have access to it. Of course, considering chains of distinctions, behind every particular distinction there stand two things: mathematical aspect from side of functionality of life, and “outer-matter-aspect”, about what we can’t say anything distinct save it comes interrelated in other aspects of reality how the functionality of life renders it to us. Of course, we would be interested to ask, what is primal, either material aspect or that of functionality of life, but it is insoluble from side of us, at least what we know up to now.

Our approach says clearly and with some precise meaning that “how we see” is aspect of life and “what we see” can’t be discerned otherwise as in Kant’s *res in se* aspect, where *res in se* refers to somewhere outside what we may try to consider. This argument comprises all physics of contemporary. There is problem, if carefully treated both approaches of our and that of positivistic science, can they be distinguished about what they argue about reality.

Many world interpretation

Many world interpretation in inside/outside equivalence appearance says nothing else than that “many worlds” is outer aspect whereas our weird quantum world is our accident of life, i.e., inner aspect. How quantum distinction is turned on by gauge freedom, may turn out to be result of unfolding of life and state of functionality where we are to live being alive in the sense we are used to. We need to develop quantum mechanics up to level where SM with BB are proper quantum theoretical aspects but not separate adapted to experiment results theory. Then we could expect these be more appropriate aspects of functionality of life easier discernible by us.

Time in physics

Our life functionality approach helps to “eliminate” time from physics, allowing it to “return” there only on the very last grade. What we have as interchange for time? First, distinctions, chains of distinctions. Second, three equivalence relations expressible as equations (1-3). Third thing would be all mathematical framework of theoretical physics as some universal law for universe that would stand for Steiner’s World System, where both differ only that

Steiner suggests some existing “law” where ours represents some present state of science. Do we need time at all in physics? Up to now we need it because whatever phenomenal description of whatever physical occurrence would require time evolution because we do not know how to characterize something/anything without time evolution in whatsoever appearance. It would sound something like tangle-tangle? Let us wait for better times to make time in something more like multi-time as David Bohm suggested us (17).

Is not *inside outside equivalence* triviality?

Is not inside outside equivalence triviality? We ask this because mathematically this would just mean such principle. Strange would be enough if this same turns out to be for positivistic science, physics, too. Really, if physical experiment can't detect its relevance in some observable aspect, then it may be only type of mathematical abstraction. Of course, we may trivially observe that some objects are within some box and not contrary. But how to check that this aspect is only within our life accident, and for “life in general” this relation “something within somewhat” does not have sense in our used way? If we follow our chains of distinctions approach, then of course, via this chain we can't anymore maintain unique assertions about “something in somewhat”, but we would accept many other cases that would solve problem in assembling distinctions in some other aggregate appropriately which would say something other about this inclusion or exclusion.

But physics may try to get some benefit from this new principle. For example, in Dirac's equation approach in getting “sea of electrons and positrons” we would be get content only with pair “electron-positron”, or two pairs in worst case, that we had in Dirac's equation leaving the “sea” solution for within life accident, because for life in general only pair (or two pairs) electron-positron, what was suggested by solution, suffices. Mathematics comes in agreement with life's in general point of view, but actually both things are the same, our equations only being some approximations to general “world-system” mentioned by Rudolf Steiner.

May *inside=outside* give something non-trivial apart from trivial interpretation?

When physicists came to “particle = wave” solution in appearance of quantum mechanics, they had to overcome non-trivial counterintuitive idea of particle wave duality. Nobody would physics force to be in peace with this duality except the solution that was so incredibly universal and precisely working. And physical experiment itself was the most persuading argument. Next step “particle = space” would require much less pain except for persuading model that brings this into existence. But this eventual solution may include, at least mathematically, trivial symmetry of type “inside is outside”. But, once more, this symmetry would be mathematical and only such, similarly as for Riemann sphere's interchange of poles is one of possible transforms that is legal and among other Möbius transforms. We in the same time assume not only mathematical but ontological in life's frame transform. It is another question that afterward this “mathematical” and “ontological” turns to be almost identical but with some other force of argument.

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