Quantum Distinction: Quantum Distinctiones!

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Abstract

How many distinctions, in Latin, *quantum distinctiones.* We suggest approach of anthropic principle based on anthropic reference system which should be applied equally both in theoretical physics and in mathematics. We come to principle that within reference system of life subject of mathematics (that of thinking) should be equated with subject of physics (that of nature). For this reason we enter notions of series of distinctions, quantum distinction, and argue that quantum distinction may be considered as freedom of motion.

Keywords

anthropic principle; anthropic reference system, reference system of life, functionality of life; cognition; mathematics, theoretical physics; classical distinction, quantum distinction; quantum mechanics, interpretation of quantum mechanics; gauge freedom; religion, psychology.

Introduction

In (1) Lee Smolin suggests discussion about grounds of physics based on positivistic approach understanding of contemporary epistemology in physical science. Lee Smolin's approach reflects and makes most acute general trends in trying to overcome or at least to understand general epistemological problems in physical science in general. In apposed to this what may be called traditional approach to deal the problem we suggest another quite new approach which turns main attention to referencing problem turning attention to fact that all

we see we see from reference system of life (2). We suggest notions *functionality of life* and *distinction* as base notions what should give the key access to deal with aspects of reference system of life. First, distinction we consider as main notion for what may be called referential physical science as apposed to some suggestively objective science nominatively/at least in positivistic sense. Notion 'distinction' we consider with the most general meaning as this word may be found in any dictionary, e.g. something that distinguishes, or the quality or state of being distinguishable, what we would tend to specify as quality to fix difference. *Distinction* we would try to make more basic notion than *motion* which since ancient times has served as most fundamental notion of whatever aspect of observation.

Functionality of life as notion we enter as aspect of *our* (or anthropic) reference system, that is, what we perceive via aspect of us being alive and just in the anthropic outset. Simply speaking, we can't observe nature as being, say, animal distinct from human being, or, say, flower, or whatever else, or, last to say, God himself. Speaking about functionality of life, we introduce a principle according which «we are built from the same stuff what we observe as nature». More specifically, we say that *blocks of functionality* and *building blocks* should be the same, if we are to access most fundamental laws of nature. Here we hold to persuasion that, what we see in anthropic reference as functionality, should directly reflect «how it is built from outside». Here we must turn attention to fact that traditional or conventional epistemology of physical science assume these facts as trivial without making difference between *functionality* in this sense and *building blocks*, but in the same time not making difference between *anthropic reference* and *objectivity* at all. If positivistic epistemology may try to leave both aspects as behind some type of curtain of agnosticism, then contemporary science more and more faces the situations that life aspect may come to play more active role as was suggested by positivistic science before. What we argue may be expressed: life is what all not only sees but produces in the sense that «how it is produced the same way it is perceived». We turn attention that it make sense only speaking from within some reference system, in our case it is anthropic reference system or reference system of life. Last designation may turn to be more general, thus we use this mostly.

In (3; 2) we discussed the idea that functionality of life may be considered to be equivalent with our mathematical thinking. We argued that mathematics might be referred to as reference system of life.

Main discussion

Physical experiment as series of distinctions

We start with short discussion (see (2)) what from our point of view is physical experiment. We say that physical measuring equipment's main requirement is to react differently on different enter data. Moreover, measuring equipment is adapted in the way to react in an assumed way, i.e., to fix difference in data of specification. But we may make this assumed definition more specific: let us say that experiment should give only two answers, yes or no, to different enter data. But every experimental measurement may be assumed to consist of series of simpler 'yes-no' measurements. We always could build such series though in praxis we always are more "successful" in producing more effective measurements but if not otherwise we could using computer model such series always.

What would we gain from such consideration of experiment in physics as series of simple distinctions? We may come to completely new interpretation of what we are measuring and what we are getting as data. Traditionally we tend to interpret physical data received from experiment in as what could be called series of interpretations. Thus, we build series of interpretations in place we should build series of distinctions. If we were persistent in our logical deduction we should "throw out old interpretations" and leave only some "suitable interpretations". But how to know what to leave and what to abandon? Maybe we live in Aristotelian world adapting new physical knowledge in old interpretational methodology and all our physical science problems are around this simple fact not to be readily to abandon old interpretations. We do not want to live without physical interpretations, not even for time being only. We do not know how long we should wait. Correctly, but we must abandon this all way of thinking and say: let us allow to assemble whatever new interpretation that is based only on physical data (read – series of distinctions) without whatever Aristotelism mixed in. What else is this mixed in Aristotelism but space, time, causality? We may measure time, space, causality? We may measure only series of distinctions. But whatever referred to as Aristotelism we reconstruct in our mind, in our interpretations, yes, partly from distinctions too, but as possibility, not as necessity. What concerns space, time and causality we would to transform them into something new, say, multitime according David Bohm, (4), but for time being judge only from series of distinctions without whatever physical interpretations at all.

Mathematical physics as series of distinctions

We may try to find more applications for our notion of series of distinctions. In physics it may be used not only what concerns physical experiment, but what concerns its mathematical description too. How to see this?

Let us assume that we have built some description of physical science in an outline of mathematical description consisting from mathematical notions, formulae, theories etc. Let us eliminate from this *mathematical corpus of physics (MCP)* all whatever could may refer to physics otherwise as in specific mathematical way. For this reason, let us denote all physical denotations in our MCP with new variables, e.g. let in place *m*, standing for mass, we put x_1, for *t*, standing for time, x_2, for *e*, standing for electric charge, x_{17}, and so on. After this operation we should have all MCP keeping all mathematical relations between numbered x-ies, that is, we should keep in MCP all what concerns mathematics and abandon all what would concern physical interpretations. After this, for reasons of convenience, we could replace x-ies with used denotations, but only with agreement that they serve us only as easer way to follow in our theory what is what, but not gives right to speak about specific physical notion, e.g., we would have right to speak about mass as convenient designation for x_1 but not as some legitimate physical notion. For us, mass should be without whatever physical sense except for a variable in some formulae.

In this way we have come to description of physics in some language of distinctions in mathematical relations. Further, we may assume that we always have such MCP in some dynamical form in every stage of development of physical science.

Further we should use this MCP approach to come to quantum distinction and gauge freedom and what follows from this.

Series of distinctions in technique

We may try to use series of distinctions approach not only in physics but some other area of human activities too. Let us turn to technique. How technical equipment is working, how cars are driving, how bicycle is functioning? All these things would be referred to technical disciplines and so on. But we interest in finding some analogies with physics. After all, physics “works” according laws of nature, and similarly technical equipment “works” according physical laws, etc. Let us try to state that technical equipment works due to series of distinctions too. We start with elementary distinctions as in case with “yes-no”

experiments. We find from observation of nature that some elementary equipment does one thing (or motion or reaction from environment) but other doesn't. Let us combine two such simple equipments, getting more complicate one. Of course, it would be impossible to decompose some complicate equipment in elementary equipments, moreover that we would to develop some theory how to do this, but here we are more interested in some general principle. And the principle says that technical equipment works due to series of distinctions where each distinction is some technical innovation or discovery which mostly are left undiscovered distinctly from part of inventors themselves, which only partly may be reflected in patents of these equipments as working principles of those. But, nevertheless, we would ask: "Why it works?". The answer is: "It works due to series of elementary equipments, where from the one is built, and due to many aspects where every one is working because of its own reason." In any case, technical equipment doesn't work because we build it from some general knowledge but because of *adaptation* of simple technical distinctions in common one. Equipment *works* because we have adapted for conditions for equipment to work. It sounds like tautology but it isn't tautology because of the active element the word "works" in this sentence. We fit conditions for *working* and equipment *works* as long as conditions for fitting stay on.

Aggregation of distinctions in patterns of reality

We know ways how to arrange distinctions to fit reality. Most traditional is that of classical physics where we arrange series of distinctions standing for physical experiments according most usual physical interpretations. We use the same patter, or try to use, for quantum physics too, but we find that we can't be successful in all cases. We have to introduce new interpretations, say, many worlds interpretation, and so on. What to do? Our approach is to abandon whatever physical interpretations at all and allow completely new arrangements of distinctions in new (or not so new) patterns of reality.

In (2) we turned attention to fact that we interpret our physical results according old interpretations [and break only when otherwise we can't go on]. We argue that we must accept general possibility that there exist other (many) ways to arrange (or aggregate) distinctions according completely different patterns in completely different pattern of reality. Let us mention religions. We may consider religions as different aggregations of reality, thus,

we may speak about religious patterns of reality got as reconstructions of series of distinctions in distinct from materialistic view way.

But one would argue that we may live with old aggregations of reality and we do not need any new. This is not true for one big reason. How to come to Bohm's multitime? We argue that reconstruction of reality in quite different pattern would be one possible way. Thus, just this multitime reality may turn out to be the largest argument because we must abandon all our contemporary interpretations in order to attack new pattern of reality. How to start? We argue that series of distinctions and their aggregation in new pattern of reality is the way possible already today.

Quantum distinction

In (5) we were speaking about self-reference systems and their aggregation in pattern called quantum self-reference system. Now we are going to speak about quantum distinction. We have several reasons or ways to introduce notion *quantum distinction*, but they nevertheless come to one common reason initiated by quantum mechanics. In (5) we connected it with Richard Feynman's path integral approach. In (3) we connected it with gauge freedom approach.

Quantum mechanical formalism works in theoretical physics in the way that all experimental data in a way agree with it. If one way of expression of series of distinctions was MCP, it may be just considered as base for introducing QM working principle in MCP. They both agree between themselves, thus, we may say that QM as part of MCP is working part of it what concerns its general working. But, if QM is only part of MCP, what concerns of their *working*, they completely coincide. Thus, our series of distinction taken as a whole turns into one common quantum distinction. But, if so, we may now try to reinterpret all what we had in traditional QM to fit now in new terms for this general quantum distinction.

Let us do this. First of all we may fix that that what are quantised due to gauge freedom are just things which are distinctions. Thus, whatever is discernable as distinct from something other occurs due to gauge freedom which caused corresponding quantization.

Quantum distinctiones!

Quantum distinctiones! From Latin this means: How many distinctions! In classical world we live as if in world of distinctions where quantum distinction we reached only after discovery of QM. Actually this is not quite so. We live as if in two worlds; one hemisphere of our brain is fit, as it seams, for distinctions more in classical sense, but other – right, more likely to other which directly "works" in terms of multitime. But we are up to now too far this realm, what is more occupied up to now by religious approaches of reconstruction of reality.

Many distinctions we perceive in many ways, both in quantitative and qualitative aspects. Those are too many, all possible distinctions, so many that we didn't notice that they play more crucial role for epistemology than *motion*. Ancient thinkers forced us to follow thought of Heraclites saying πάντα ῥεῖ, i.e., that of motion, that of change, but who warned us to mind: "Quantum distinctiones!"? Maybe, this is due to fact that series of distinctions are only seeming part of reality what we perceive due to unbalanced development of one part of thinking – that of reductionism to distinctions leaving other way, holistic way of thinking, so undeveloped up to the latest time.

Mathematics as reference system of life

Let us discuss which right we would have to call or refer to mathematics as reference system of life. Previously we argued that MCP represents quantum distinction both as series of distinctions of mathematical outline and as effective representative where both they work similarly, or, identically. According such approach mathematics turns out to be more cognitive subject that something else. Thus, we take mathematics as way of thinking at most physical (physiological, cognitive) level. What new with what we had before? We were treating mathematics as way of thinking always. But now we have something new: not only way of thinking, but both thinking and subject of thinking belongs to one and the same area, and they both should be referred to functionality of life.

What we discover in nature is order on all levels. Disorder is as if left outside laws of nature but it is present in part of nature what we consider as causal coerced part which unfolds on time projections. Lorentzian world (3+1) is aspect of life granted for us to live in. For this reason it is completely anthropic viewpoint. But we must take into considerations that all what we perceive as via our cognition refers to the same: all this has sense only from reference system of life. How it looks like "from outside"? is question without answer on

whatever level. But it doesn't mean that we may take all what we perceive via reference system of life as some sort of "reality". If we are tended to think in this way we must accept at least possibility that there are infinitely many other ways to reconstruct reality using other aggregation patter of quantum distinction.

Quantum distinction as freedom of motion

Looking from Lorentzian 3+1-window we would to think that the picture God has given us to look on world is too specific. Actually, we have received very rich access to whatever in world around us. It is sufficiently general due to fact that functionality we are built in is as general as possible which may be characterizes by formula: quantum distinction as freedom of motion. Why we have such general access to "mysteries" of universe? Religious reconstructions of reality say simply: God created us in similarity with himself.

Other examples of series of distinctions and quantum distinction

In last chapter we add some other possibilities of eventual ways to reconstruct reality by rearrangement of quantum distinction. Most used in past are religious ways of thinking. In this connection we may say only that some religious reconstruction of reality may turn out to be mostly useful for some scientific investigation.

Let us turn attention to less obvious example of reconstruction of reality. And it concerns psychology. We know that we are used to think differently. Moreover, we may build completely different systems of "philosophy" and then find out how differently we "see things". Why we think differently? We argue that it is due to fact that we are used to use our own systems of reconstruction of reality. Then after we start to argue between to find "some common truth" and without success. Why? Truth is not existing thing? No, we cannot agree between ourselves because we do not accept cognitive metaphysical reality: we have build each his/her own reconstruction of reality, and unless we do not learn to understand laws according which we are building our "local theories" we are compelled to live in the divided world of different meanings and aggregations of these meanings.

Extended anthropic principle

In traditional approaches anthropic principle is considered as principle that tries to fit physical science as it is received via physical experiment with ways of reconstruction of reality in classical ways. Following these approaches, anthropic principle turns out to be some "appendicitis" which should be cut out at the first opportunity.

We suggest completely different approach to anthropic principle which gives possibility to completely explain all what goes on in physics and reconcile it with eventual religious ways of thinking and with whatever anthropic setups. Moreover, we suggest approach according which whatever reconstruction of reality would be allowed if only it may be only alternative rearrangement or reaggregation of series of distinctions or quantum distinction in general.

Interpretation of quantum mechanics

The approach suggested may be presented as alternative interpretation of quantum mechanics. If this interpretation allows to be considered as general as with equation of quantum distinction with freedom of motion in most general sense, then it as general principle might serve as interpretation of quantum mechanics. Quantum distinction standing for whatever possible series of distinctions then serves as quantized set of quantities arising due to gauge freedom. Whatever motion (along time projections) belongs simply to general gauge freedom. Gauge symmetry causes quantization of all what we perceive as distinctions. Disorder thus is such only on time projections: in general it must sum up to order in multitime (see Bohm (4))

Conclusions

We come to conclusion that anthropic principle may be extended considerably and cover all physical science. In the new outline, what we now consider as separate subjects of mathematics and physics should become one common subject – quantum distinction as freedom of motion, or new interpretation of quantum mechanics.

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References

1. **Smolin, Lee.** *The Trouble with Physics. The Rise of String Theory, the Fall of a Science and What Comes Next,* A Mariner Book, 2006.

2. **Zeps, Dainis.** *Mathematics as Reference System of Life: preliminary observations.* Riga : Internet publication, 2009.

3. **Zeps, Dainis.** *On Reference System of Life.* Riga, Quantum Distinctions, 2009. http://www.ltn.lv/~dainize/idems.html.

4. **Bohm, David**. *Wholeness and the Implicate Order*, London, Routledge, 2002.

5. **Zeps, Dainis.** *Classical and Quantum Self-reference Systems in Physics and Mathematics.* Prague : KAM-DIMATIA Series, 2007. 807, 24pp.