About Fuzzy time-Particle interpretation of Quantum Mechanics (it is not an innocent one!) version one

The major point in [1] chapter 2 is the following claim:

"Any formalized system for the Theory of Computation based on Classical Logic and Turing Model of Computation leads us to a contradiction."

So, in the case we wish to save Classical Logic we should change our Computational Model.

As we see in chapter two, the mentioned contradiction is about and around the concept of time, as it is in the contradiction of modified version of paradox. It is natural to try fabricating the paradox not by time but in some other linear ordering or the concept of space. Interestingly, the attempts to have similar contradiction by the other concepts like space and linear ordering, is failed.

It is remarkable that, the paradox is considered either Epistemological or Logical traditionally, but by new considerations the new version of paradox should be considered as either Logical or Physical paradox.

Hence, in order to change our Computational Model, it is natural to change the concept of time, but how?

We start from some models that are different from the classical one but they are intuitively plausible.

The idea of model is somewhat introduced by Brouwer and Husserl [3].

This model doesn't refute the paradox, since the paradox and the associated contradiction would be repeated in this new model. The model is introduced in [2].Here we give some more explanations.

In the model derived from Brouwer-Husserl idea, the instants of time are fuzzy numbers with finite support and the paradox would not be solved. But, by considering instants of time as fuzzy numbers with infinite support the problem would be solved. (as you see in [2])

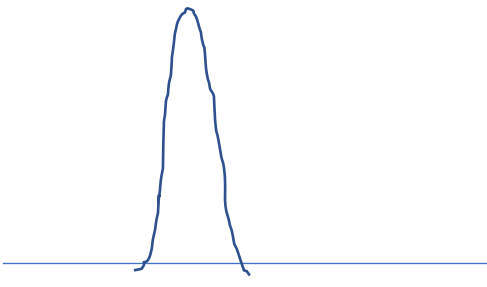

Fig1.Instants of time (finite support)

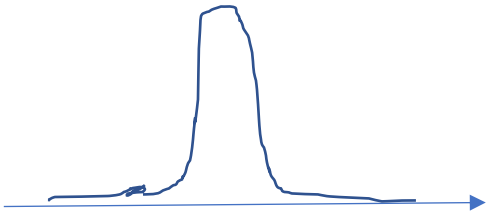

Fig2.Instants of time (infinite support)

The idea of instants of time as fuzzy numbers with infinite support seems bizarre at the first glance.

Now we have the first question:

1.Is there anything to support it and to make the situation more rational and natural?

Yes, as an answer Quantum Mechanics supports this idea. But let we do it after answering the following question:

2.We consider the instants of time as Fuzzy numbers, are they Computable?

In [2] we compute them, by applying Quantum Mechanics. The derived functions are functions with infinite support. Also, we reply the first question.

One of the major point is:

To solve the first paradox and to save Classical Logic, first we consider an intuitive notion of time which is not the classical one.

Actually, this model (We call it here, Brouwer-Husserl model) doesn't solve the paradox. It requires some changes.

More exactly, in modeling intuitive notion of time we consider instants of time as fuzzy numbers with finite support. We change it

to fuzzy numbers with infinite support.

It is noticeable and somewhat surprising, Quantum Mechanics confirms and supports this change. Not only Quantum Mechanics

Confirms that but also by employing it, the instants of time would be computable.

To do this, we need a new interpretation of quantum Mechanics.

Now, we introduce a new interpretation of Quantum Mechanics. In this new interpretation, **Fuzzy time-Particle interpretation** of quantum mechanics, particles are not waves in the same time. Instead of that, the concept of time is changed.

Third question, About Hidden Variable:

No, hidden variable.

Fourth question, About Locality:

It is not a local Theory.

Fifth question, Question of Measurement:

Since instants time are function here, it seems natural that we have a combination of states in each instant of time. The instants of time are similar in different degrees, so the states should be a combination of different states. It is similar to the weighted combinations of real situation in classical model of time.

Sixth Question (Reality of time and cause and effect):

In this model, the instants of time are fuzzy numbers, some functions from R to R. Here, what does it mean when we say the cause is before the effect? This could be simply an ordering of some functions.

More Mathematically, When we say a fuzzy number is bigger than the second here what do we mean exactly? It is similar to comparing two scatterings. Average of one is bigger than the second one. If the function of time is

Bell shape and symmetric, it means the x coordination of the peak of one is bigger than the x coordination of the peak of the second one.

Indeed, in this model (Fuzzy time-particle interpretation of quantum mechanics) the reality of time is not what is measured, but what is measured help us to find the reality of time, the associated fuzzy function.

So, it is natural that in measurements in classical models, sometimes we see the effect has happened before the cause. Based on the rules of probability it is probable, but in Fuzzy time- particle

Interpretation It never happens, since here we compare the functions as explained above. Seemingly, a positive point!

In brief, the real time here is a fuzzy function but what we see in experiments are some numbers, by repeating the experiments we approximate the function and reality.

Seventh Question, Is this a solution for the known contradiction between Quantum Mechanics and Theory of Relativity? Is everything in this respect be solved here?

What is the theory here? By employing the new interpretation, we have a combination of the two theories. To do that is relatively simple, computing time as fuzzy numbers, and putting them in the equations of Relativity Theory.

The contradiction between these two Theories happens when we compute a concept from two ways, and from two theories. Actually, we find two different dimensions for a Physical concept. But now, by combining these two theories we have one theory and there is no such a choice! (Haven't we

contradiction in the theory? We should show the way from quantum Mechanics is closed in the new way.)

So, it might be the first question answers positively.

The possibility of unification of these two theories in one Theory was not possible to be done in previous interpretations, as a result we don't know this interpretation an innocent one.

But about the second part of the question, the problem should be verified by experiments.

Eighth question, entanglement: (The problem of simultaneity)

I feel stuck right now!

Help me, please!!

Seemingly, in this interpretation doing the experiment of entanglement practically as it is described in Classical models of quantum mechanics, is impossible. Unless we do it couple of times. A statically solution.

Hich do event hamzamaan nistand.Faseleh motevaset yek zaman baa khodash sefr nist.

Indeed, in this model two different events are not simultaneous. It is remarkable that, the average distance of an instant of time with itself is not zero.

Yani dar azmayesh do event momken ast hamzamaan baashand va yaa hamzamaan nabaashand, amma dar vaghiyate marboot beh in model

Har do event taa andaazeyi hamzamaand vat aa andaazeyi hamzamaan nistand, va hich do eventi kaamelan hamzamaan nistand.

Nemidaanam dar azmayeshgaah cheh etefaaghi moiotad/

In experiments, two events could be considered either simultaneous or not. We have two number represent the time of occurrence of that events. They are either

Equal or not.But in the reality of the mentioned model any two events are simultaneous in some measure and they are not simultaneous in some degree. As mentioned before no two events are completely simultaneous.

Seemingly, the above points are the major challenge of this subject.

To put(sh) forward the theory, the above explanations lead us to introduce new concepts about the time, as it is usual and known in Mathematics.

About two events we should define concepts like "Expected value of Simultaneity" and 'Expected value of being un-simultaneous", so we are able to define much simultaneous and less

Simultaneous. In this model, between each two events and two instants of time, we have "Expected value of Simultaneity".

Two instants of time:

$$T_1 = f(t_1 + x), T_2 = f(t_2 + x)$$

The distance between these two instants of time would be:

$$d(T_1, T_2) = \int_{y=-\infty}^{y=+\infty} \int_{x=-\infty}^{x=+\infty} f(t_1 + x) - f(t_2 + y)\, dxdy$$

Clearly, there exist $d(T_1, T_1) = \varepsilon \neq 0$ and $\forall T_1, T_2 \;\; d(T_1, T_2) \geq \varepsilon$.

When two events e_1, e_2 occur in T_1, T_2 the "Expected value of Simultaneity" is computed in above by $d(T_1, T_2)$.

But usually in experiments we have two real number t_1, t_2 as time of events. In this case we compute the "Expected value of Simultaneity" of e_1, e_2 as following:

$$\int_{y=-\infty}^{y=+\infty} \int_{x=-\infty}^{x=+\infty} f(t_1 + x) - f(t_2 + y)\, dxdy$$

In the case that we compute the time of an event in different ways, and we have $t_1, \dots, t_n$.

Now, firstly we compute t_s , $f(t_s + x)$ such that the function adopts to the distribution made by $t_1, \dots, t_n$.

Mathematically, our problem is to find t_s such that

$$\sum_{i=1}^{i=n} f(t - t_i)/\mathrm{n} - f(t - t_s)$$

Would be minimum.

What we wish to show in above is:

"Although working with this model is somewhat more complicated because of measuring time, but it is doable and not hard".

9. The problem of Time: The problem of time is solved in benefit of General Relativity.

Seemingly, anything is in benefit of Einstein ideas, considering Quantum creatures as Particles and about the concept of Time, surprised!!

Refrence:

1.Is Classical Mathematics appropriate for Theory of Computation?, Farzad Didehvar, Vixra(2017) and Philpaper(2019)

2."Fuzzy time", From Paradox to Paradox (Does it Solve the Contradiction Between Quantum Mechanics & General Relativity?), Farzad Didehvar, Philpaper(2019)