Fuzzy Time and the possible impacts of it on science [9]

Mass Time, Mass System, Electrical Charge Time (Infinities in Physics)

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Abstract. Here, we continue the discussion in [1], about infinities in Physics. Our goal

is to create a Mathematical system to give a probable explanation for infinities in QED,

based on Fuzzy time. This Mathematical system should be sufficiently satisfactory and

Simple. In general, our goal of these series, is to provide more reasons to consider time

as a fuzzy concept in a way that is explained in [4], [5], [6].

Keywords. Mass Time, Electrical charge time, "Fuzzy Time-Particle" interpretation of Quantum Mechanics, Infinities in Physics, QED, *MASS-SYSTEM*, *ELECTRICAL CHARGE SYSTEM*

In "Fuzzy Time-Particle" interpretation of Quantum Mechanics [2], [3], [4] we need some new concepts associated to the fundamental concepts, Mass and Electrical charge. These new concepts are created to explain the infinities in Physics.

In experiment and based on "Fuzzy Time-Particle" interpretation of Quantum Mechanics, the mass of any substance is computed in an instant of time. We call it **mass time** ($M_{m.t}$). So for the same particle in two different instants of time we have two different mass times. It is supposed that, we have an ascending function g from R to R, such that

$$\frac{M_{1,m.\,t_1}}{g(S_1)} = \frac{M_{1,m.t_2}}{g(S_2)}$$

We call this ratio **imaginary mass** ($M_{imaginary}$). S_1 and S_2 are the area of functions associated to instants of time t_1 and t_2. (We hope f would be a simple function like identity).

Now the relation between what we know as mass in the classical system, mass time is:

$$M = Log_k(M_{m.t})$$

Hence, in instant of time t_1

$$M_{imaginary} = \frac{k^M}{g(S_1)}$$

In brief, throughout the article, the reason that we know the mass turns to be infinity, is the area of the function of instant of time that mass is computed. In these cases, the area of the instant time function is infinity. That's the essence and central point of our discussion.

Contradiction: When the area of fuzzy time changes by changing time, $M_{imaginary}$ does not remain fixed unless g is a constant function (By the last equation), which can't be true in our theory.

Therefore, we change the theory and formulas as follows

$$M_{m.t} = k_1{}^{M_{imaginary}{}^{g(S_T)}}$$

$$M = Log_{k_2}(M_{m.t})$$

$$M = g(S_T) \cdot c \cdot M_{imaginary}$$

In above, g(t) could be infinite, consequently M would be infinite when $M_{imaginary}$ remains a finite number.

Although at the first glance, probably, the above system of concepts about mass seems appropriate, but practically in Physical situations and problems, more specifically in QED usually the difference of two masses are finite. To have this and to capture the situation, we present a correction of the second system as follows (The third system)

$$M_{m.t} = (k_1{}^{M_{imaginary}})^{g(S_T)}$$

$$M = Log_{k_3}Log_{k_2}(M_{m.t})$$

$$M = Log_{k_3}(g(S_T) \cdot c⬚ \cdot M_{imaginary})$$

$$(Or \ M_{imaginary} = k_3{}^M \ /g(S_T) \cdot c⬚) *$$

In our fictional theory, the problem arise when $g(S_T)$ is infinite and it is supposed that is just the reason, M goes to be infinite. ***Roughly speaking in above system, by considering the third equation, the difference of Two masses could be finite. So this mathematical system depicts the situation of infinites in QED. We call the triple (k_1, k_2, k_3) "mass triple constants".*** By considering the last formula, the difference of masses *could be finite*, even in the case that the computed masses approach infinity. As an important possibility, we compute the masses at

time t (Abstratct tme [3]), in two different systems. Two different systems, give us two different instants of time for the same abstract time. These two systems could be the general system (Maybe, cosmic system) and a more specific system.

For these instants of time and by the third formula in above, we have two masses
$M1, M2$ respectively, which we hope their difference is finite, in our studying cases. Seemingly, this system satisfies our desires.

Remark: In all above discussions, the author suggestions are about creating a theory to answer how infinity comes in the middle. Here, we try to find the reason around and related to the fuzziness of time. Actually the cases that, the associated function of time is heavy tail function (or a function that its associated area is infinity), are in our interest. Also, probably g is an ascending function and $\lim_{x \to +\infty} g(x) = +\infty$.

A Generalization: In the last formula of the third system, instead of ratio, a more general function from R^2 to R, could be considered, ascending respect to the first argument and descending respect to the second argument. Possibly it makes more Mathematical flexibility. The formulas would be as following:

$$M_{imaginary} = G(k_s{}^M \ , g(S_T) \cdot c⬚)$$

$$M_{m.t} = (k_1{}^{M_{imaginary}})^{g(S_T)}$$

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As an example and possibility define $G(X,Y) = \frac{X}{Y^\alpha}$.

In all above, the best chance is when G is division operator and g is identity function.

REMARK. In this discussion, we have two systems, the first is classical one, based on classical time and the second is based on Fuzzy Time-Particle interpretation of quantum mechanics. In above formulas, simply M (classical mass) is introduced in the Classical System and the others in the system based on Fuzzy time and the interpretation of Quantum Mechanics.

$M_{m.t}$ More exactly, is the mass which is calculated in an instant of time and $M_{imaginary}$

is the concept of mass which is defined independent of time. These two concepts are defined in the system based on Fuzzy time and Fuzzy Time interpretation of quantum Mechanics.

Definition: We call $(M_{m.t}, M_{imaginary}, M)$, *MASS-SYSTEM*.

As the second point, it is notable to say that we have a similar discussion and definition about electrical charge. Analogues to *MASS-SYSTEM*, we have *ELECTRICAL CHARGE SYSTEM*.

The third point is about computing g(&G) and which system is appropriate, the third system or the generalized form of it the fourth system. That is not done yet. We hope the function g defined in this article would be a simple function like identity function!

Conclusions The above attempts shows some flexibilities based on "Fuzzy time -Particle" interpretation of Quantum Mechanics, to provide some reasons to reply infinity problem in Physics and QED. Some other formulations are possible too. For instance, our formulation is based on the area of the instant time function, (so based on integral operator), more general operators seem possible to be considered. As a simple example, we can consider weighted integrals. In general, this article is a toddling in this way.

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