The Sohraab-Hyder or SH set theory.

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I) Introduction:

In my theory, "A relativistic theory based on the Invariance of Newton's second law for motion and the constancy of the speed of light in vacuum", we came across the equation $T' = \frac{v' - v}{1 - v/c}$. Later we found that the quantities v, v' and c were fictional as they were related to a fictional absolute inertial reference frame. However, the quantity, T', was found to be real as it was measurable and related to a real, non-absolute inertial reference frame. Thus the above equation tells us that an expression, $\frac{v' - v}{1 - v/c}$, though containing fictional quantities can give a result that is real. Specifically, we see that the ratio of fictional quantities gives a result that is real. It is interesting to note that the laws of physics that we use in our everyday life and which form the basis of Newtonian Physics (NP) is actually based on fictional quantities or numbers. This means what we have considered to be real numbers throughout our human history are in fact fictional numbers. The non-fictional quantities or numbers we encounter in extreme cases such as in Quantum Mechanics (QM) and Relativity (R). The physical laws we encounter in QM and R actually use non-fictional numbers and describe phenomenon that is outside the realm of human senses. From Bohr's Correspondence Principle (CP) we find that the laws of QM and R are reducible to the laws of NP. This means we are actually substituting non-fictional numbers with fictional numbers. Putting it in a different way, the human mind is better at perceiving fictional quantities/numbers than non-fictional quantities/ numbers. Eventhough this notion is counter intuitive it is nevertheless true.

Using these ideas we can formulate a new type of set theory. We can say that all fictional numbers together with all the results of all the possible mathematical operations that can be done on them and all the equations that can be formulated using them (these, of course include all the laws of NP) with all the possible relationships between those equations form a set. This set we will call a Sohraab-Hyder or SH set. We can similarly form a SH set using the non-fictional numbers. Since, we have seen that a non-fictional number can be represented as the ratio of two fictional numbers, it is obvious that all the non-fictional numbers are contained in the SH set containing fictional numbers as we have also said that the fictional SH set, containing fictional numbers, also has as it's elements all the possible mathematical operations that can be done on them, which obviously includes the ratios of the fictional numbers. Now, since the non-fictional numbers are also elements of the SH set of fictional numbers, it means that all the elements of the SH set with non-fictional numbers are also present in the SH set containing fictional numbers. In other words, the SH set of non-fictional quantities is a subset of the SH set of fictional quantities. This means the SH set of fictional quantities not only contain the laws of NP, but also the laws of QM and R.

II) The Sohraab-Hyder or SH set:

We define a Sohraab-Hyder or SH set of Q^{th} order as one which consists of elements, designated by N^a, and which has the following properties: (1) The element $N^a = (N^b)'$, where N^b is the SH set of b^{th} order from which we derive the SH set of a^{th} order by putting the symbol for prime on the elements of the SH set of b^{th} order. (2) N^a represents not only any number that is derived from the numbers of by putting the symbol for prime on them, but also represents all the possible results of all the possible mathematical operations that can be done on the elements of N^b with the symbol for prime placed on them. (3) N^a also represents all the possible results of all the possible mathematical operations that can be done on the elements of N^a. (4) N^a also represents all the possible equations that can be derived using all the elements of N^a.

At this point the reader will have the following questions:

1) We have defined a SH set using another SH set. This is tautological. I completely agree with this statement. However, to define a SH set in the broadest sense possible with the least number of words we can only use a definition that is tautological. This definition for a SH set suffices for now. As we explore the SH sets it will become clear to the reader, by the end, that a non-tautological definition can be formulated in a way that the reader can easily grasp the basic idea of a SH set. But if we start with the non-tautological definition now we will end up with a definition containing so many concepts that the definition will not only be too cumbersome for the reader, but the reader will not be able to grasp the basic idea of a SH set easily.

2) What do we mean by the order of a SH set? Remember that we have

not defined what values 'a' can take in N^a. We have not set 'a' to be natural numbers, including zero, which will give us a linear order for the SH sets, such as N^0, N^1, N^2,.........and so forth. Our SH sets do not form a linear, stacking order, like a skyscraper, but form a tree with infinite branches with each brach giving rise to infinite branches and so on. The trunk of our SH set tree we represent by the greek symbol for capital omega, Ω. This SH set, Ω, has as it's elements all the possible, whether real, fictional, non-fictional, non-(non-fictional) and so forth numbers together with all the possible results from all the possible mathematical operations between them and all the equations that can be formed using them with all the possible results from all the possible mathematical operations that can be done between them and all the possible mathematical operations with all the other elements of the set. This SH set, Ω, thus contains within it the entire tree while at the same time forms the trunk of the above tree with infinite number of branches. I will discuss more about Ω later in this paper, but suffice it for now that Ω is the ultimate SH set and that there cannot be a superset of Ω,other than Ω itself, of which it is a sub-set.

III) Properties of a SH set:

1) Just for the sake to be complete, we can easily see that there are an infinite number of SH sets, with both finite, which includes zero number of elements, and infinite number of elements.

2) It is not necessary that $N^b \subset N^a$ where $N^a = (N^b)'$. The two SH sets we discussed in (I) are an exception due to the fact that we know

about the relationship between the real and fictional numbers, namely, a real number is a ratio of two fictional numbers. Other than these two SH sets we do not have any knowledge about any relationship between N^a and N^b in general, except for $N^a = (N^b)'$.

3) Any SH subset, including Ω, is a subset of itself, i.e. $N^a \subset N^a$.

4) A SH set can have zero to infinite number of elements.

5) The null SH set, { }, is subset to every other SH set including itself.

6) The next order SH set of a null SH set is a null SH set.

7) The Ω SH set is both it's own subset and it's own superset, i.e $\Omega \subset \Omega$ and $\Omega \supset \Omega$. This we represent by $\Omega \equiv \Omega$.

IV) Further thoughts on Ω :

As promised I like to discuss Ω further. As was said before, Ω is the ultimate SH set. It is quite obvious that the number of elements in Ω is infinite. We will represent an element of Ω by the symbol N^∞, i.e. Ω is a SH set of infinite order. Of course, there are infinite number of SH sets with infinite number of elements, but we will restrict the use of the symbol N^∞ to represent an element of Ω, only. It is easily seen that if we try to create a SH set from Ω, i.e. $(N^\infty)'$ we end up with N^∞ only. This is because the symbol ∞ does not represent a quantity or a number, but a concept and therefore the element $(N^\infty)'$ is also already an element of Ω. Suppose we form a Ω' from Ω. Then the elements of Ω', which we will represent by $(N^\infty)'$ are not contained in Ω. But this contradicts the definition of Ω as was given before when we discussed the meaning of the order of a SH set. Hence, $(N^{\infty})'$ must also be an element of Ω . This means $\Omega' \subset \Omega$. By the same logic if we have $(\Omega')'$ then it will also be a subset of Ω . Thus has no superset other than itself. To use our tree analogy, we can say that Ω is the trunk of all the infinitely possible trees or to put it in other terms, the tree whose trunk is Ω is the only tree that can possibly exist. In the section, "Discussion and Conclusions", I will show that Ω can not only possibly exist, but that it must exist. Also, that Ω has always existed and will always exist. It is self-sufficient. It created itself in pre-eternity and it cannot be destroyed, even by itself, i.e Ω can never be reduced to a null SH set.

V) Discussion and Conclusions:

At this point the reader may well ask as to why do we need yet another set theory? The answer to this question, as the reader will find out, lies in the following discussion and conclusions:

1) It is clear that all the possible sets of the current set theory that has mathematical quantities as their elements are also SH sets.

2) As we have seen in the introduction, time, either Newtonian (NT) or Einstein (ET) are also elements of a SH set. This can be generalized to say that any kind of time, even non-NT and non-ET are also an element of a SH set.

3) There must exist an infinite number of SH sets that has as their elements mathematical quantities that form logically consistent algebras.

4) Since Descartes showed that geometry can be expressed using algebraic equations, we can see that there must exist an infinite number of SH sets with elements that are algebraic equations and which form a logically consistent geometries.

5) From the set theory we know that multiple copies of an element(s) does not change the set. For example the set { 0, 1 } $\equiv$ { 0, 1, 1, 1, 1, 1, 1,1,1.....infinite times }. Hence the set Ω is the same even if it has an infinite number of each of it's infinite elements. This means it has infinite number of infinite kinds of "time" with infinite number of equations containing these infinite kinds of "times". Other than the equations that has "time" which does not move, all the other infinite equations are continuously producing and destroying the infinitely various number of elements of Ω. However, even the infinite number of equations, that destroy the other elements, that contain "time" that moves at an infinite rate will never be able to destroy all the elements of Ω to reduce it into a null SH set because they will take an infinite amount of time to destroy all the infinite number of elements present in Ω . Besides, also has equations that are creating elements at an infinite rate using the infinite kinds of "times". Hence, eventhough Ω is infinitely dynamic it is the same at any given moment of the infinite kinds of "times". One can take the analogy of our Sun. Though it appears to be unchanging at any moment of time, we know that it is extremely dynamic and undergoing violent and rapid changes at every moment in time. This proves that Ω has always existed and will always exist and never changes. Since $\Omega \equiv \Omega$ it is self-sufficient.

6) The existence of Ω automatically guarantees the existence of all the infinite number of SH sets that are subsets of Ω . This means the guarantees the existence of the SH set that contains the physical laws (or equations) that operate within our universe. Also, Ω automatically guarantees the existence of infinite number of SH sets that will give rise to infinite number of universes with infinitely different and logically consistent set of physical laws including infinite number of universes with the same physical laws as those in our own universe.

7) From # 6 above we can easily see that Ω automatically guarantees the existence of an infinite number of SH sets that have finite number of elements and which constantly change due to one of the infinite kinds of "time" being present in them and the equation(s) which are also present in them. These special type of SH sets we will call "mathematical cells".

8) These mathematical cells can have different properties depending upon their elements. Unless a mathematical cell has the kind of "time" that does not move, they are necessarily dynamic units. They can, (1) create and/or destroy elements within them, (2) take in elements from around them if they have the appropriate equation(s) to allow such a process, (3) they can form bonds between each other or with other mathematical cells to give rise to organs and organisms from the simplest to the most complex. These are all, of course, mathematical organs and organisms.

9) The Ω automatically guarantees the existence of an infinite number of mathematical cells that has the property that makes them evolve and

thereby makes the organism built with them to also evolve. In short Ω automatically guarantees evolution of mathematical organisms.

10) Since we know that the organic cells use the same physical laws as the rest of the non-organic universe, we can conclude that some of the infinite number of our mathematical cells is equivalent to the organic cell. This means the entire organic universe is nothing more or less than a mathematical universe. This also means Ω automatically guarantees the creation and evolution of the entire organic universe, which also includes us human beings. Also, we see that Ω guarantees the evolution of organisms as propounded by Charles Darwin in his famous book, "On the origin of species".

11) Finally, as we have learned from the computers that any and every mathematical quantity (which includes equations) is reducible to a string of 0's and 1's, we can conclude that this entire universe, which includes both living and non-living entities, are ultimately strings of 0's and 1's. Hence, the creators of the movie "Matrix" were correct when they showed that everything is a matrix of 0's and 1's. Here, we have mathematically proved that their concept/intuition was/is correct!

12) In another paper I will delve deeper into the concept of the mathematical cell and construct, "The Mathematical Cell Theory".

References:

1) A relativistic theory based on the Invariance of Newton's second law for motion and the constancy of the speed of light in vacuum. Mustafa A. Khan. viXra:1406.0054. viXra.org.