THE FUNDAMENTAL INCONSISTENCY OF ARITHMETIC

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There are many questions in physics and in many other branches of the mathematical sciences which remain un-answered and to which there does not appear to be any realistic prospect of being answered in the foreseeable future. One of the most prominent of these questions is the matter of achieving a unity between gravitation and quantum mechanics. This is a subject which has defied a solution for many years if not for generations. Many predictions of an imminent solution to the question of a so-called "theory of everything" have been made but none have been fulfilled and nor does it seem likely that they ever will be.

This being the case perhaps we should ask the question-"Are we looking in the right places for a solution?". Indeed one might comment that if we are looking for something and never find it, then either we are looking in the wrong place or possibly that the thing we are looking for does not in fact exist.

My own opinion on this subject is that there is every likelihood of a solution being found, but for that solution to be found it will require some radical new approaches since it does seem that conventional approaches to the problem have consistently failed and there is every likelihood that they will continue to fail in the future.

One of the biggest stumbling blocks on the path toward solving this problem is that the solutions of General Relativity result in expressions representing a singularity of infinite mass. This statement is worthy of further examination. We know that the expression for a black hole $c^2 = \frac{2GM}{R}$ results in a singularity of infinite mass. We also know that it appears that black holes are commonplace throughout the universe and it has been hypothesised that a black hole exists at the centre of every spiral galaxy.

Now we can ask ourselves two questions. The first of those is-"What is the meaning of the word "infinite"?". The word infinite among other things means

something that is all encompassing or the total conceivable amount. In other words, there can only be one infinitude of anything and this applies to the concept of mass. The second question that we must ask ourselves is-"How many infinite masses (or black holes) can there be?". The answer to both these questions when taken together must be a contradiction in terms or an oxymoron. There cannot be more than one infinite mass and that is the mass which includes all the matter in the entire universe including its component black holes.

Thus we must conclude that the equations of General Relativity are not complete.

Instead of addressing this question in terms of mass, I propose addressing it in terms of the singularity itself, that is to say through the medium of the integer 1. The integer 1 in mathematics is taken to signify unity, however my contention here is that under certain circumstances, the number 1 does not signify unity and it does itself consist of a number of component parts which themselves do not sum to unity and it is this proposition which leads to an inconsistency in mathematics which is fundamental to our understanding of singularities.

It will be recalled that Kurt Godel submitted the Incompleteness Theorem in the 1930's. That theorem proved conclusively that mathematics is not necessarily based on secure axioms and that in fact as a result arithmetic was itself incomplete and what is more can never be considered to be complete. Thus I submit that this same hypothesis can be applied to that symbol of unity-the integer 1.

To develop this hypothesis further we can proceed as follows by showing that the number $0.999^{\bullet}$ is in fact equal to 1.

(1) Let $x = .999^{\bullet}$

(2) Multiply both sides of (1) by 10 and we get $10x = 9.999^{\bullet}$

(3) Subtract (1) from (2) and we get:-

$$10x = 9.999^{\bullet}$$

$$\underline{x = 0.999^{\bullet}}$$

$$\underline{9x = 9.000}$$

$$\therefore x = \frac{9}{9}$$

$$\therefore x = 1$$

Thus we see that in infinite series of integers less than 1 equates to unity. However by reversing this process we can show that a singularity can in fact equate to less than 1 as follows.

The foregoing shows that $x = 1$ and therefore $x = \frac{9}{9}$,

(4) $\therefore 9x = 9.000$

Now add (1) to both sides of (4) and we get:-

$$9x = 9.000$$

$$\underline{x = 0.999^{\bullet}}$$

$$10x = 9.999^{\bullet}$$

$$\therefore x = \frac{9.999^{\bullet}}{10}$$

$$x = 0.999^{\bullet}$$

Thus we can see that in fact unity equates to an infinite series equating to less than 1. Furthermore it is interesting to note that the forgoing examples apply to any integer in any base for example in base 3.

(5) Let $x = 0.222^{\bullet}_{3}$

Multiplying both sides by 10 we get

(6) $$3x = 2.222\overset{\bullet}{}_3$$

Subtracting (5) from (6) :-

$$3x = 2.222\overset{\bullet}{}_3$$

$$\underline{x = 0.222\overset{\bullet}{}_3}$$

$$2x = 2.000\overset{\bullet}{}_3$$

$$\therefore x = \frac{2}{2}$$

$$\therefore x = 1$$

Again by reversing this process we can show that a singularity is in fact less than 1and of course this will apply to any base i.e:-

$$x = \frac{2}{2}$$

$$2x = 2.000\overset{\bullet}{}_3$$

Adding $x = 0.222\overset{\bullet}{}_3$ to both sides we get:-

$$2x = 2.000\overset{\bullet}{}_3$$

$$\underline{x = 0.222\overset{\bullet}{}_3}$$

$$3x = 2.222\overset{\bullet}{}_3$$

$$x = \frac{2.222\overset{\bullet}{}_3}{3}$$

$$x < 1$$

and this applies to all integers in all bases.

CONCLUSION

If a singularity in fact equates to less than 1 we can hypothesise that a singularity of infinite mass cannot exist on its own. The only singularity of infinite mass that can exist might be the sum of all existing singularities although that hypothesis raises further questions about the nature of infinity which in fact may itself possess a kind of duality where two states exist simultaneously.

If that were the case it may be that there are limits as to what mathematics can ultimately describe.

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