Finite Infinity: No Boundary Proposal

Think deeply about simple things (The Ross Mathematics Program): how come infinitely small and infinitely many chunks of physical stull could *assemble* a finite object, neither zero nor infinite? What if the Hausdorff space, the second countable space, and the 'open set' are spherical cows?

An infinite (Georg Cantor) crowd of mathematicians enters a pub. The first one orders a pint, the second one a half pint, the third one a quarter pint, **...** , *ad infinitum*. 'I understand' — says the bartender and pours two pints.

The catch: All **ideal** points on the real number line, including our finite interval 'two-pint beer', are **non**-denumerable, meaning that we may not associate any numeric label, obtainable *after* counting the points, with the **non**-denumerable **ideal** points. Counter example: an open interval of 10 real apples will be [2,9] apples separated by a **gap** of **non**-apples.

Let's zoom on the real number line, as "real numbers can be thought of as all points on an infinitely long line" (Wikipedia). The two-pint beer above can occupy a [closed interval], because the **[**beer**]** is embedded in the pub (think of the pub as some kind of 'ambient background' with a larger size).

But there *must* be some **gap** "between" the points on the number line, which separates the *boundary* of the beer from the pub. Otherwise all points at the *boundary* of the beer will be *identical* with the points of the pub. We may not fuse two "neighboring" points into one (Zeno). If we do it, the entire real number line will collapse into one single **point** (p. 7).

So, what is the "size" of the **gap** itself? Enter the puzzle of *the* continuum: read Wolfram and p. 5 and p. 27 in Newton.pdf. Mathematicians have been trying to sweep the problem under the rug by using "open sets". No way. Read p. 7 below, and p. 11 and p. 19 in talk.pdf. As Murphy once noticed, complex problems have simple, easy-to-understand wrong answers.

I have explained the solution to the **gap** at my website: the *pre-geometric* "vertical" infinitesimal step (p. 8) along the arrow of spacetime. Briefly:

1. The *finite* size of 'two-pint beer' is obtained by the bartender after speculating about infinity as a **limit** (recall Dedekind completeness), which *requires* the actual/absolute infinity (Georg Cantor) operating exclusively in the global (**Platonic**) mode of spacetime. In the local (physical) mode, **nothing**, not even a human thought, can *actually* reach infinity as a **limit** and stop there — recall Thomson's lamp. You are not Chuck Norris.

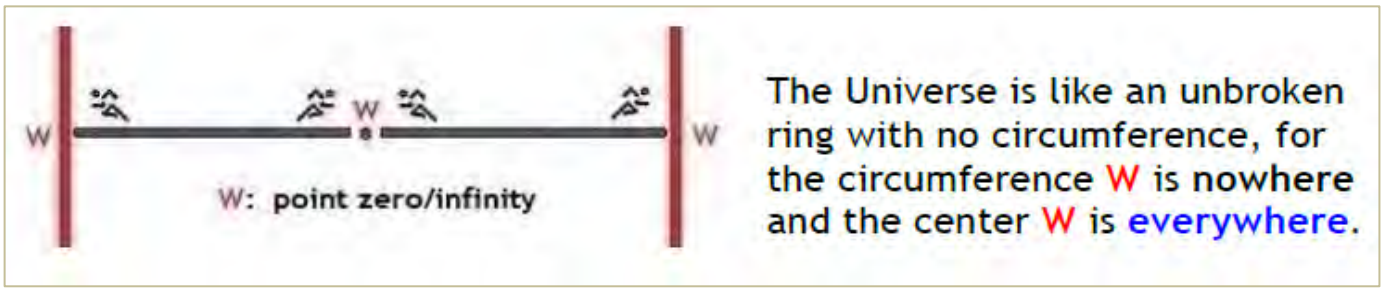
2. In the local (physical) mode of spacetime, you cannot "drill" the real number line to hit the **gap** (**non**-apples, p. 1): see the [air] between apples below and also the vertical strips separating the consecutive balls below.

A set (bag) of denumerable apples

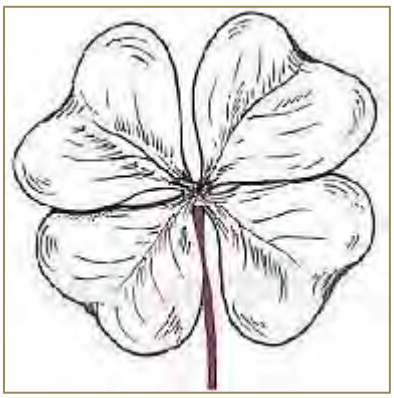
Every consecutive ball is **re**-created

3. In the global (**Platonic**) mode, Nature is infinitely differentiable (C^{∞}): you cannot hit the **UN**speakable cognitive vacuum viz. the ambient **Platonic** world. If you could, you will be short-circuited with it. The latter is like a **colorless** canvas (p. 5 in Newton.pdf) for local (colored) 4D physical world.

NB: Mathematicians wrongly mix (1), (2) and (3), and suggest Hausdorff space, second countable space, and 'open set'. The ambient **Platonic** world is **always** nullified in the physical world. We need Mathematics to "see" it.



All the **black** points in the picture above belong to the 'flattened' 4D **lily** shown on p. 2 in Netwon.pdf (reproduced below) and denoted 'local mode', and all **red** points pertain to the *atemporal* pre-geometric **Platonic** world. The arrow of spacetime (**W**) leads to **re**interpretation of "negative mass".



It also creates “anti-gravity” (Ned Wright).

The flattened, or rather “collapsed” **lily** stands for the 4D spacetime called ‘local mode of spacetime’. It is being **re**-created by the arrow of spacetime (**W**) depicted in Slide **1**. The **lily** is (**i**) the physical 4D world that can *never* reach (**ii**) the *atemporal* pre-geometric **Platonic** world due to the *potential* infinity in the topology of physical, 4D spacetime. On the other hand, (**ii**) is endowed with the *actual/absolute* infinity (Georg Cantor). Hence the union of (**i**) and (**ii**) leads to Finite Infinity (**FI**) shown in the last drawing at p. 2.

Once created at the Beginning (John 1:1), the entire Universe is “already” eternal. Thanks to **FI**, there is no way, not even with Gedankenexperiment, to reach ‘time **zero**’ and stop there, in a short-circuit with the Beginning. Read about the so-called vacuum cleaner paradox (VCP) along the deflation time toward ‘time **zero**’ on p. 8 and p. 3 in *Platonic Theory of Spacetime*. And thanks to **FI**, the Beginning at ‘time **zero**’ is quietly residing “inside” every consecutive instant ‘here and now’ along the arrow of spacetime (**W**) depicted above. Clearly, a lot of work is needed to dress **FI** in Mathematics.

Another task in the arrow of spacetime (**W**) is the *force* of Time: the **self-acting** Fifth Force rooted on the Unmoved Mover (pp. 7-8 in SEM.pdf) and propelling up↑ the entire 4D physical world (local mode of spacetime).

Mathematically, the "dark space" in the drawing above is the *ambient* infinite-dimensional Euclidian space (p. 5 in Newton.pdf) which is **always** nullified in the physical, **re**-created and "collapsed" 4D **lily** pictured above.

Notice that the force of Time requires ***acceleration***, but in our case the acceleration is **non**-relational: the "dark space" is exactly nullified. This is the reason to suggest two *modes* of spacetime, hence 4+**0** D spacetime. Needless to say, the **self-acting** Fifth Force is **not** a physical "dark" force.

The mathematical presentation of **re**-created "collapsed" 4D **lily** poses nontrivial challenges: we need Mathematics. Read about the sphere-torus transitions at pp. 8-9 and pp. 12-14 in talk.pdf, and at p. 5 in Netwon.pdf. More here and here. I will be happy to explain the challenges sketched above to all mathematicians fluent in topology and differential geometry: everything "happens" on null surfaces (p. 6 in Force.pdf). Forget GR. There is a big abyss between current theoretical physics (J.A. Wheeler) and the anomalous **facts**: p. 4 and p. 10 in text.pdf, and pp. 8-11 in Force.pdf.

To avoid misunderstandings: the **ideal** points above (p. 1) are the **Platonic** world, which cannot be touched or detected with any physical device. For example, you cannot touch an **ideal** geometric sphere (the **grin** of the cat *without* the cat). You can touch only a real physical object with a spherical shape, e.g., a football. Likewise, you cannot perceive the **UN**speakable cognitive vacuum. Only its "jackets" explicating its invariant meaning.

To sum up, Finite Infinity (**FI**) is *the only way* to assemble **absolutely** all **physical** (p. 7) points of any real physical object (a two-pint beer) without gaps and without counting: **FI** employs the *absolute* infinity (Georg Cantor) at the **Platonic** world. This is how Nature creates every *finite* object along the arrow of spacetime (p. 3). Thanks to the *potential* infinity, there are no *physical* boundaries in the 4D **physical** world. Once created (John 1:1), the Universe is "already" eternal: no *physical* stuff can reach its beginning/end and stop there (p. 2). This is the crux of my 'no boundary proposal' (p. 1) based on metacalculus. And the math is patiently waiting to be unraveled. You can't paint a picture without a canvas: see the **colorless** canvas here.

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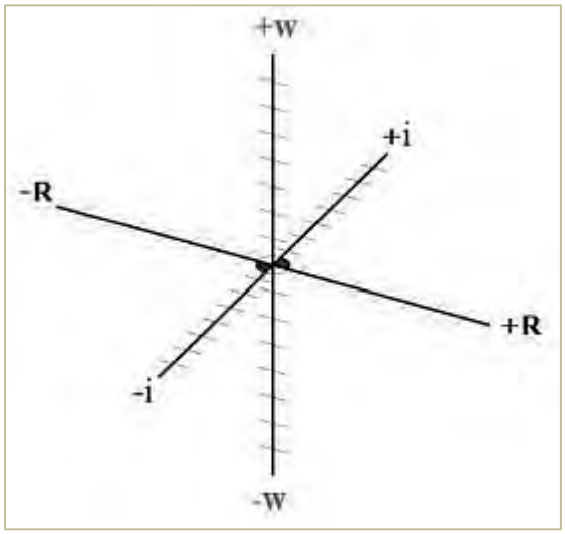
Questions and Answers

Q1: The only tool that works is math, so how do you envisage metacalculus?

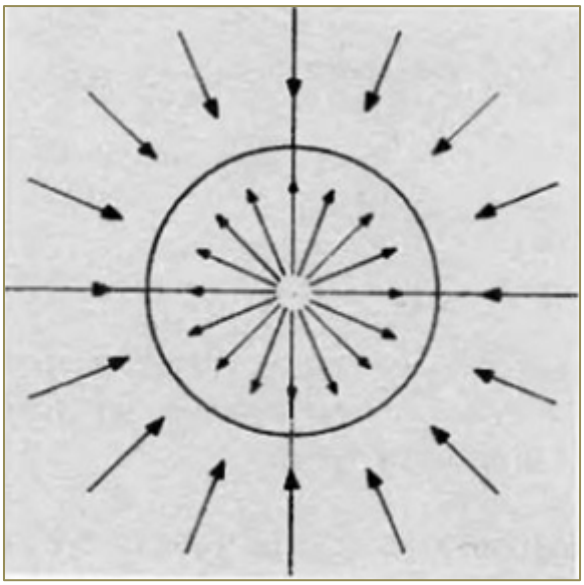
A1: The scope of metacalculus is explained at **NB** above. Let me repeat the introduction to the so-called *hyperimaginary numbers* (p. 6 in Force.pdf): there is no **gap** (Zen or Dao) in the number line. I propose to augment the number line with *hyperimaginary numbers* (**W**) pertaining to the **Platonic** world, such that the ***squared*** **W** decays to complex numbers, and nothing else. This may lead to *hypercomplex* analysis with which we can calculate 4D derivatives in 4+**0** D spacetime. For example, I expect to eliminate the mythical "black hole" (p. 5 in Force.pdf) and the so-called "dark energy".

I postulate *three* degrees of freedom of the **ideal** points (p. 4 and p. 7):

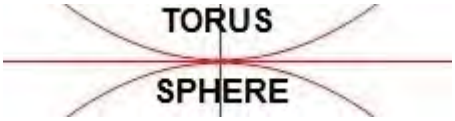


In the physical 4D world, $\mathbf{W}^2 = 0$ (p. 8 in Force.pdf). We should be able to calculate the **physical** state of every *finite* object in the local (physical) mode of spacetime with hypercomplex analysis. In the case of our two-pint beer (p. 1), one can indeed apply the terribly murky (**ε**, **δ**) recipe of "limit" — just shut up and calculate. Another example: if we know the physics of a football, we can calculate the *possible* size of an inflated football. No need to worry about gravity. But in the case of observational cosmology, we do not know how gravity works. Read about the *tug-of-war* gravity on p. 15 and p. 11 in Newton.pdf. The first off task is to present the gravitational size of every domain of 4D spacetime as a **superposition** (Sic!) of two CPT-symmetric inverted universes, in order to calculate the *possible* **cutoff** on their gravitational parameters, imposed by their gravitational environment, similar to the pub with a two-pint beer embedded in it (p. 1).

To understand what I mean by 'inverted universes', I will offer the old joke about how a mathematician (let's call her Alice) will catch a lion in Sahara. She will assume that there is at least one lion there, and then she will drag a cage for lions in the middle of the desert, lock up herself inside, and perform space inversion w.r.t. the **2D** cage surface, such that all points outside the cage surface will be **inverted** inside the cage, and vice versa. At the end of the day, Alice will find herself outside the cage, while the poor lion will be CPT-inverted and locked inside, like inverting a right-hand rubber glove into a left-hand one. Ditto to Alice, of course. See a hint from Mike A. Armstrong below (*Basic Topology*, Springer, 1997, p. 104, Fig. 5.7).



The circle above has a *finite* size, only in our case the "circle" is **3D** space. The opposite arrows above stand for *atemporal* sphere ⇔ torus transitions (p. 9 and pp. 12-14 in talk.pdf). We enjoy *asymptotically* flat 4D spacetime (no "dark" stuff) at the infinitesimal neighborhood of the inflection point below, whereas the perfectly flat horizontal & vertical lines (denoted **W**) stand for God (1 John 4:12) placed "inside" every 4D event here-and-now.



Are you interested in metacalculus and hypercomplex analysis? I can go further, but I'm not at all sure that mathematicians would respond, ever. The only feedback from them hit me in May 2012, from Maurice de Gosson (Mon, 21 May 2012 18:47:46 +0200): "Buzz off, idiot!"

Q2: Can you explain your ideas in simple terms?

A2: Let me start with Euclid, the father of geometry. He suggested a very simple definition of a geometric point: 'that which has no part' (Wolfram). Then I apply Plato's proposal to 'that which has no part' and introduce the *pre-geometric* **non**-denumerable **ideal** points (p. 1 and p. 4), and the core idea of metacalculus (p. 5). So, what is the difference between the **ideal** point(s) and the real points? You can talk about a "limit" of a sequence, which is *indefinitely* running "closer and closer to a given number", and you can see the "limit" fixed at a real point from the real number line; e.g., a zero-dimensional geometric point from a circle shown here. But you *cannot* see the infinitesimal "error term" or "**gap**" here, because it does *not* belong to the physical world viz. to the real number line. The "**gap**" is the **Platonic** *pre-geometric* **ideal** world, which we can "see" only with our imagination, just like we can imagine an **ideal** geometric sphere *only* by looking "through" a real physical football (p. 4); see Table 1 below.

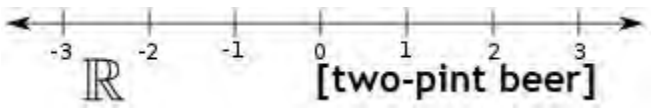
The *pre-geometric* and **non**-denumerable **ideal** point(s) of the **Platonic** world as ONE	ONE single **point** stretched to infinity
The real points of the real number line, with numerical labels from infinite counting	

Table 1. Read Wolfram and limit.

You can install 'by hand' differentiable structure only on the real number line. Briefly, the **ideal** point(s) of the *pre-geometric* **Platonic** world have *three* degrees of freedom (p. 5). The "hyperreal numbers" do not exist, because the *hyperimaginary* numbers collapse to **one** single dimensionless **ideal** point that shows up in the real number line, hence can be "dressed" with physical stuff from a physical [two-pint beer] or [football]. There are no "open sets". Don't mix the **Platonic** apples with *physicalizable* oranges, like mathematicians do (p. 2). You can't paint a picture without a canvas.

As to quantum mechanics and cosmology, we need *hypercomplex* analysis: read p. 6 in Force.pdf. Forget GR. Nature has a **dual** presentation during the arrow of Time, depending on the two *complementary* paths toward **it** (not "Him"): see Slide 14. For more, read closely BB1 and BB2 in Force.pdf.

Again, the only solution to the puzzle of *infinitesimal* is the *pre-geometric* "vertical" infinitesimal step along the arrow of Time: $Q_2 - Q_1 > 0$.

The elementary step into the future is "explicitly nonzero and yet smaller in absolute value than any real quantity" (Wolfram): the *atom of geometry*. It is 'that which has no part' (Wolfram), with **zero**-dimensional footprint on the real number line and **nonzero** *hyperimaginary* extension (p. 5). This is how Nature works without "gaps". Only mathematicians aren't interested.

Q3: In practical terms, what can you put on the table?

A3: Spacetime engineering (SEM.pdf). The core idea is very old. Recall Sir Arthur Eddington, "the stuff of the world is mind-stuff", and Max Planck: "There is no matter as such. All matter originates and exists only by virtue of a force which brings the particle of an atom to vibration and holds this most minute solar system of the atom together. We must assume behind this force the existence of a conscious and intelligent spirit. This spirit is the **matrix** (emphasis added – D.C.) of all matter." But the Platonic **matrix** is not "mind-stuff". **It** (not "He") is the *atemporal* **Platonic** world (Slide 14) above your neck. Read Werner Heisenberg and John A. Wheeler. Capiche?

Q4: What can I do to hit the jackpot?

A4: Kalispera Stavros! In theory, if you hit the jackpot, there are only two possible ways to interpret such event. One is blind luck, and the other is synchronicity. There is no way to find out which one actually happened. And you can't employ the synchronicity either — you cannot influence the potential **future** (the **grin** of the cat *without* the cat) of any event. You are like a single fish. Just keep pushing, because you never know. Anything can happen. The future is open up to 'the *unknown* unknown'.

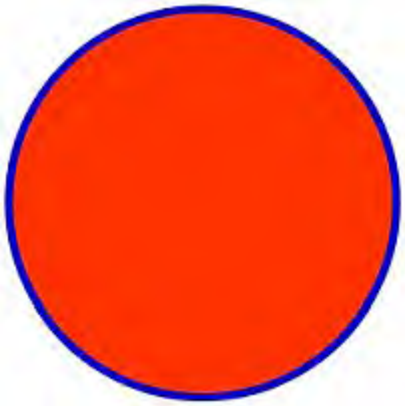
7 March 2023, 18:08 GMT

For the record

On 9 March 2023, the link to the report above was sent by email to 150+ mathematicians and theoretical physicists. I reject the notion of open set, because it is an insult to our intelligence. If we were talking about a set of real physical objects, such as 10 apples, an "open set" (1,10) will be a "closed set" [2,9]: read p. 1 above. And then we can happily count the apples and distinguish two neighboring apples separated by 'non-apples'.

Quote from Wikipedia: "In mathematics, an open set is a generalization of an open interval in the real line. (...) Intuitively (Sic! – D.C.), an open set provides a method to distinguish two points." Look at the drawing below.

The red set is an open set, and the blue set is its *boundary* (Sic!) set. How can you "distinguish two points", red and blue? You have to *count* them, and then install some gap "between" the points, which is neither a 'red point' nor a 'blue point'. This "intuition" in distinguishing "two points" is an insult to our intelligence.



Why? Because you cannot count the **non**-denumerable (ideal) points in *the* continuum: "there are **exactly** as many points **c** on a line (or line segment) as in a plane, a three-dimensional space, or finite hyperspace, since all these sets can be put into a one-to-one correspondence with each other" (Wolfram). If we denote the points on a line (or line segment) **c**, in a plane $\mathbf{c_1}$, in a three-dimensional space $\mathbf{c_2}$, and in a finite hyperspace $\mathbf{c_3}$, then what is the total number of all points $\mathbf{c} + \mathbf{c_1} + \mathbf{c_2} + \mathbf{c_3}$? **Non**-denumerable, again. You may not count them nor label them with *any* color or numeric labels. Thus, the "intuitively clear" drawing above is 'not ever wrong'.

The only possible solution is provided by Finite Infinity (FI), as it covers — without counting and without gaps — **absolutely all** colored points in the drawing above plus **absolutely all** colorless (white) points, *en bloc*. This is the **ideal** point(s) as ONE, which gives birth to the *physical* world (p. 7, and p. 3 and p. 12 in quantum.pdf). This is how Nature works, in my opinion.

D. Chakalov
10 March 2023, 13:49 GMT

Platonic World: The Force of Life, Time and Gravity

I am writing a book with the title above, aimed at the general audience. To get a glimpse at it, read the first paragraph of my website (link below) and follow the links. The book will be supplemented by a set of video lectures, which will (hopefully) explain the Platonic World to my 'digital generation' readers, who simply don't touch paper, like my children and grandchildren.

In the first part of the book, I will present its skeleton, ensuing from a set of first principles borrowed from Zeno (the paradox of motion), Aristotle, Plato, Heraclitus, and Leibniz (the common origin of matter and psyche). The second part will supply the first one with firmly established facts from Mathematics, life sciences, physics, and psychology, like a Husserl's *noema* — an indefinite whole, which is gradually filled with concrete content. And the third part will derive the predictions of the theory; for example, how to use the Platonic World to combat climate change — spacetime engineering based on the Fifth Force. In my opinion, this is *the only way* to save our planet from climate catastrophe. By 2030, we must be ready to implement the technology of producing unlimited clean electricity. Read about the upcoming climate crisis at the end of my website. Time is running out!

This is the scope of my forthcoming book. I will soon promote it, in order to find a suitable publisher, by demonstrating the Fifth Force* in my theory of Time and gravity — read *Über die Geschwindigkeit von Licht und Zeit* and *Spacetime Engineering Manual*. I do not claim some "discovery", but a low-energy manifestation of gravitational rotation, which looks anomalous only in the framework of your current, and essentially incomplete, gravitational theory. The effect has to be studied under controlled laboratory conditions, to find out whether we can — or cannot — unleash and control much more powerful gravitational rotation and rotate the turbines of power plants without any nuclear or fossil fuel, and produce unlimited clean electricity. Again, this is *the only way* to avoid the devastating climate catastrophe, for the sake of our children and grandchildren. Time is indeed running out.

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14 March 2023, 08:33 GMT
*Watch modified gravity from 03:50 to 04:09 at vimeo.com/734682937.