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Ask A Genius 158 – Elements of a New Set Theory (Part 3)
Scott Douglas Jacobsen & Rick Rosner
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[Beginning of recorded material]

Rick Rosner: Fuzzy deals with things that are well-defined. They do not have exact values, but they have exact probability sets. So some of the members of the fuzzy set can take any value between 1 and 2.

Scott Douglas Jacobsen: Whatever that value is, it has an infinite string of digits implying an infinite amount of information.

RR: Quantum mechanics deals with finite information and, thus, fuzziness. IC takes that – I don't know if farther than that, but it implies that – I guess it does – even the rules to some extent that the universe is operating under are not operating really well until the universe becomes well-enough defined for the rules to become definite. I don't believe in the deal where every universe that comes into being through Big Bang processes with spontaneous symmetry being that every universe that comes into being that way randomly picks its own rules of physics.

I feel like the rules of physics are the rules of information, and are, thus, pretty tightly constrained, but the constraints are pretty wimpy when you have small not very old and not very filled with information universes, which makes it hard to tell different universes apart. You have to come up with a whole version of set theory if you're going to get anything out of it. One that is better able to handle nebulous entities.

SDJ: I think you can draw an analogy to biological systems that are grown. I think the rules of a universe are akin to the growth and development of biological systems, or if you look at the growth and development of a brain over time. It has relatively well-defined patterns of growth with certain things coming online within pretty tight ranges. So the rules will be pretty tight, but there will be a range of flexibility for them.

In a manner with information processing physics, you have development of a universe over similar timelines and stages of development, but at different scales. There will be consistency. You noted fuzzy sets imply information, but the rules will be fuzzy themselves. But it is growing.

RR: There's a fuzziness that I don't admit, which is the larger amount of flexibility in picking the rules of physics and picking the physical constants. I tend to think that all physical constants reflect the amount of information in the universe and the way that the things in the universe are arranged. There's not a whole lot of freedom in the physical constants. They are determined by the conditions of the universe.

You don't get the physical constants first and then the universe evolves according to those constants. The physical constants change in accordance to the changes in the universe based on

the rules of information. The proton-electron mass ratio is probably reflecting the amount of hidden or non-active or frozen information in the universe. That is, matter that is out of the electromagnetic interaction game.

You take a big star and you let it collapse into a neutron star, and beyond that into a blackish hole. It is not doing a lot of electromagnetic interaction because everything has kind of been mushed together into stuff that neutronium and beyond, where all of the various charges that would be emitting a gazillion photons or just the star at an earlier stage with all sorts of ionized proton and electrons and other nuclei, interacting with each other.

Sending of a gazillion photons via electromagnetic interaction, but a star made of neutronium as far as I know doesn't do a lot of electromagnetic stuff because all of it is locked into this largely zero charged thing. It is out of the game in terms of—it can still absorb photons gravitationally, but it doesn't absorb photons into electron shells and then emit all of the photons via the electrons dropping back down to a ground state or anything like that.

Even more so for blackish holes, my guess is that the ratio of close to 2,000-1 of protons to electrons in terms of mass and all that reflects at least the fact that there is a lot of collapsed matter than provides heft to the universe and anchors it, and keeps space open and defines space and that defining thing having kind of more impact on, I guess, protons. Now that I say it is sounds like bullshit – and I'm still going to say it, but that increased definition going to protons more than to electrons.

Probably because protons are more subject to neutrino interactions. Now, I am getting deep into bullshit. Anyway, protons weigh 1,900 times or so more than electrons. I'm guessing that to some extent represents hidden information in the form of collapsed matter. So anyway, it is not a free-floating constant. It is not like the universe said, "Hey, let's make the electron-proton mass ratio this."

No, it is a measure of something with regard to information.

[End of recorded material]

Authors[1,2]

[1] Four format points for the session article:

1. Bold text following "Scott Douglas Jacobsen:" or "SDJ:" is Scott Douglas Jacobsen & non-bold text following "Rick Rosner:" or "RR:" is Rick Rosner.
2. Session article conducted, transcribed, edited, formatted, and published by Scott.
3. Footnotes & in-text citations in the interview & references after the interview.
4. This session article has been edited for clarity and readability.

For further information on the formatting guidelines incorporated into this document, please see the following documents:

1. American Psychological Association. (2010). Citation Guide: APA. Retrieved from http://www.lib.sfu.ca/system/files/28281/APA6CitationGuideSFUv3.pdf.
2. Humble, A. (n.d.). Guide to Transcribing. Retrieved from http://www.msvu.ca/site/media/msvu/Transcription%20Guide.pdf.

[2] These sessions and the correspondence are different expressions of the same ideas. In correspondence, we discussed this:

> ***Scott Douglas Jacobsen: I thought about sets of sets of sets and universes in universes in universes. The former do not fit the latter; the latter do not fit the former. Standard logic, math, physics, and set theory equate sets and the universe; the universe equates to a set. "The universe" describes one noun with encapsulation of everything. Sets in standard set theory describe single instantiations of the universe.***
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> ***No necessary correspondence between the universe and set theory; the universe - as R. Buckminster Fuller described the dynamic, or verb form, rather than asserted static, or noun form, nature of the universe as "universe" - does not map onto set theory in whole. The static describes the dynamic in single instantiations. Sets describe single instantiations of the universe. Set theory applied to the universe describes single time slices. I will explore this later.***
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> ***Set theory describes elements and sets. The Empty Set ({}), a single element, elements in subsets, subsets in sets, and sets in supersets, and {}, the elements, subsets, sets, and supersets in the Universal Set (U) – and U contains {}, the natural numbers and whole numbers with zero set (N_0), the natural numbers and whole numbers set without zero (N_1), the integers number set (Z), the rational numbers set (Q), the real numbers set (R), and the complex numbers set (C), or "U = {N_0, N_1, Z, Q, R, C}."***
>
> ***{} remains contained in U, or other sets, without explicit statement. Arithmetic does the same. You write, "1 + 2 + 3 = 6," rather than, "0 + 1 + 2 + 3 = 6." Set theory makes one assumption: absolute definition. "Absolute definition" implies infinites. I thought about it. The assumption equates to the problem. This relates to the problems with infinities, and infinities within infinities.***
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> ***Elements consist of absolute definition or definite precision. "Definite elements" can clarify the idea. The basic premise of set theory becomes explicit with the new idea. An implication of infinite information, and infinite internal and representational precision. Sets consist of elements; sets consist of definite elements. Ergo, definite elements mean definite subsets, definite sets, definite supersets, and a definite U. Definite means absolute precision or definition with infinite information.***
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> ***The same with standard notions of "1 + 2 + 3 = 6," or "Set A = {x, y, z}." Same with 6 equivalent to A, and 1, 2, and 3 equivalent to x, y, and z, respectively. Logic meets math. For one previous example, "U = {N_0, N_1, Z, Q, R, C}" consists of an absolute definite or definite precision as the definite U.***

Standard set theory assumes an infinite digit series – zeroes or complex digit series, or infinite precision, as with standard logic, math, and physics. Standard logic, math, physics, and set theory make the same big, wrong assumption: absolute definition. They work in limited or partial circumstances.

Informational Cosmology, or IC, creates the total framework. An Informational Cosmological Set Theory, or ICST, works from the simplest statements in set theory - the elements.

The elements amount to a general abstract category, which implies operational efficacy in math, logic, and physics too. IC without the assumption of the infinite digit series; IC with the empirical substantiation with the finite digit series shown in the finite universe and its finite constituents – space, time, matter, radiation, fundamental forces – weak, strong, electromagnetic, and gravitational, and particles and their higher order agglomerations. This creates one strength in IC over and above, and against, standard logic, math, physics, and set theory.

By analogy, in an IC or narrative universe, all stories begin, develop, and end. All characters contain finite depth and relations, and so information. A narrative universe begins, develops, and ends with agents at various scales with finite depth and relations, and so information. An IC universe follows the evidence with one shift in one axiom: absolute or infinite definition to partial or finite definition. Logic, math, physics, and set theory shift from the bottom-up; IC re-creates the entire landscape with all scientific evidence, too.

Novel versions of {}, N_0, N_1, Z, Q, R, C emerge in this. Probabilistic flavors of {} and other sets with further specification of the information in each. For example, 0.0 differs from 0.00 differs from 0.000 differs from 0.0000, but each can represent {}. Each needs more or less information than the other based on the length of the digit series. {} comes in one flavor in standard set theory; {} comes in different flavors in ICST. Same for every element – not definite element, elements in subsets, subsets in sets, and sets in supersets. Information content implies the flavor, scent, or sound of the concepts in set theory.

Furthermore, this set theory, ICST, does not equate to standard set theory. It means ICST because of the shift in assumption. An assumption, assertion, a fundamental premise, or an axiom supported by all empirical evidence, ever: finite parts of a finite universe rather than infinite parts in an infinite universe. Infinity remains <u>the</u> big, wrong assumption in all logic, math, physics, and set theory.

ICST changes logic, math, physics, and set theory. Even further, ICST maps logic, math, physics, and set theory to the universe, its contents, and other universes, or the non-standard sets of information spaces, or mind spaces, to any size – theoretical or actual.

ICST, with one more axiom, can shift the landscape for set theory. Any set implies 1-dimensionality; definite elements in definite subsets, definite subsets in definite sets, definite sets in definite supersets explain single instantiations in time. For example, sets A, B, and C equate to particles A, B, and C. Each with property sub-1, sub-2, and sub-3. That is, "Set A $_{\{1, 2, 3\}}$," "B $_{\{1, 2, 3\}}$," "C $_{\{1, 2, 3\}}$" describes one event, superset D. One event, D, comprises subevents, A through C, in a single instantiation of time.

ICST makes set theory 2-dimensional. By analogy, the three dimensions of space become compression into 1-dimensionality with the descriptors in sets applied to attributes of particles. The addition of the time dimension, not compressed, creates the 2-dimensional set theory, ICST, applied to physics. Multiple instantiations over time. D $_{\{1, 2, 3\}}$ over, for example, the timeline of a mind space. Each D_n as indicative of a single instantiation of sets A, B, or C, or particles 1, 2, or 3. Advanced ICST incorporates the interactions in the sets. These sets' or particles' values, as shown earlier, remain finite or countable, probabilistic, and indeterminate. The larger the set then the greater the countable, less probabilistic or more certain, and less indeterminate or more determinate.

IC creates ICST. ICST includes all science and its evidence, present and future, because the universe presented by science remains finite, in part or whole. So one shift in one axiom, and one add-on axiom of "2-dimensionality," creates ICST, and correspondence with all scientific evidence. Universe, the verb

form, describes the dynamic universe; ICST describes the dynamic universe. Each becomes the other at different levels of precision…

Rick Rosner
American Television Writer
RickRosner@Hotmail.Com
Rick Rosner

Scott Douglas Jacobsen
Editor-in-Chief, In-Sight Publishing
Scott.D.Jacobsen@Gmail.Com
In-Sight Publishing

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