The Axioms of Complementary Set Theory

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Here is a list of my axioms, which are related to
R:

A definition for a point:
A singleton set
[b:f306e071da]p[/b:f306e071da] that can
be defined [b:f306e071da]only[/b:f306e071da] by tautology ('='),
where [i:f306e071da][b:f306e071da]p[/b:f306e071da][/i:f306e071da] has
no internal parts.

[u:f306e071da]A definition for an interval (segment):[/u:f306e071da]
A singleton set
[i:f306e071da][b:f306e071da]s[/b:f306e071da][/i:f306e071da] that can
be defined by tautology ('=') or '<' or '>', where
[i:f306e071da][b:f306e071da]s[/b:f306e071da][/i:f306e071da] has no
internal parts.

[u:f306e071da]The axiom of independency:[/u:f306e071da]
[i:f306e071da][b:f306e071da]p[/b:f306e071da][/i:f306e071da] and
[i:f306e071da][b:f306e071da]s[/b:f306e071da][/i:f306e071da] cannot be
defined by each other.

[u:f306e071da]The axiom of complementarity:[/u:f306e071da]
[i:f306e071da][b:f306e071da]p[/b:f306e071da][/i:f306e071da] and
[b:f306e071da][i:f306e071da]s[/i:f306e071da][/b:f306e071da] are
[b:f306e071da]simultaneously[/b:f306e071da]
[b:f306e071da]preventing/defining
[/b:f306e071da] their middle domain (please look
at
http://www.geocities.com/complementarytheory/CompLogic.pdf
to understand the [b:f306e071da]Included−Middle[/b:f306e071da]
reasoning).

[u:f306e071da]The axiom of minimal structure:[/u:f306e071da]
Any number which is not based on |{}|, is at least
[i:f306e071da][b:f306e071da]p[/b:f306e071da][/i:f306e071da]_AND_[i:f306e071da][b:f306e071da]s[/b:f306e071da][
where
[i:f306e071da][b:f306e071da]p[/b:f306e071da][/i:f306e071da]_AND_[i:f306e071da][b:f306e071da]s[/b:f306e071da][

is at least Multiset_AND_Set.

[u:f306e071da]The axiom of duality([color=Blue:f306e071da][b:f306e071da]*[/b:f306e071da][/color:f306e071da]):[/u:f306e071da]
Any number is both some unique element of the collection of minimal structures, and a scale factor (which is determined by |{}| or [i:f306e071da][b:f306e071da]s[/b:f306e071da][/i:f306e071da]) of the entire collection.

[u:f306e071da]The axiom of completeness:[/u:f306e071da]
A collection is complete if an only if both lowest and highest bounds are included in it and it has a finite quantity of scale levels.

[u:f306e071da]The Axiom of the unreachable weak limit:[/u:f306e071da]
No input can be found by {} which stands for Emptiness.

[u:f306e071da]The Axiom of the unreachable strong limit:[/u:f306e071da]
No input can be found by {__} which stands for Fullness.

[u:f306e071da]The Axiom of potentiality:[/u:f306e071da]
[i:f306e071da][b:f306e071da]p[/b:f306e071da][/i:f306e071da] {.} is a potential Emptiness {}, where [i:f306e071da][b:f306e071da]s[/b:f306e071da][/i:f306e071da] {._.} is a potential Fullness {__}.

[u:f306e071da]The Axiom of phase transition:[/u:f306e071da]
a) There is no Urelement between {} and {.}.
b) There is no Urelement between {.} and {._.}.
c) There is no Urelement between {._.} and {__}.

Urelement ([url]http://mathworld.wolfram.com/Urelement.html[/url]).

[u:f306e071da]The axiom of abstract/representation relations:[/u:f306e071da]
There must be a deep and precise connection between our abstract ideas and the ways that we choose to represent them.

([color=Blue:f306e071da][b:f306e071da]*[/b:f306e071da][/color:f306e071da])
The Axiom of Duality is the deep basis of +,−,*,/ arithmetical operations.

Tautology means [i:f306e071da][b:f306e071da]x[/b:f306e071da][/i:f306e071da] is itself
or
[i:f306e071da][b:f306e071da]x[/b:f306e071da][/i:f306e071da]=[i:f306e071da][b:f306e071da]x[/b:f306e071da][/i:f306

Singleton set is [url]http://mathworld.wolfram.com/SingletonSet.html[/url] .

Multiset is [url]http://mathworld.wolfram.com/Multiset.html[/url] .

Set is [url]http://mathworld.wolfram.com/Set.html[/url] .

(By the way the diagrams in my papers are also proofs without words
[url]http://mathworld.wolfram.com/ProofwithoutWords.html[/url])

More detailes about my work can be found in:
[url]http://www.geocities.com/complementarytheory/No−Naive−Math.pdf[/url]

[b:f306e071da][u:f306e071da]The Axiom of the
paradigm−shift:[/u:f306e071da][/b:f306e071da]

[color=Blue:f306e071da][b:f306e071da]Within any consistent system,
there is at least one well−defined set, which its content cannot be
well−defined within the framework of the current
system.[/b:f306e071da][/color:f306e071da]

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I started my private research about 25 years ago, by asking myself,
what are the minimal conditions that give us our abilities to count.

You can find this research in:

[url]http://www.geocities.com/complementarytheory/ONN1.pdf[/url]

[url]http://www.geocities.com/complementarytheory/ONN2.pdf[/url]

[url]http://www.geocities.com/complementarytheory/ONN3.pdf[/url]

An overview of my basic perceptions of the Language of Mathematics and
its reasoning, can be found in:

[url]http://www.geocities.com/complementarytheory/No−Naive−Math.pdf[/url]

As for your question about the usefulness of my system:

>
> *I was just curious Doron: What are the problems with the number*
system that exists today that would make you want to change it? Like
they say, "if it aint broke, don't fix it."
>
Today's number system is a quantity−only system, which ignores the
internal complexity of the natural numbers (and I do not mean to the
differences between primes, non−primes, odds , evens, partitions,
permutations, etc..., which are all based on
0_redunduncy_AND_0_uncertainty building−blocks), which are the
building−blocks of the entire standard system.

In short, my number system is based on the information concept, where
each building−block in it has an internal structure that cannot fully
described only by quantitative−only and

0_redundancy_AND_0_uncertainty approach of the standard system.

The main concept of my new number system is based on the complementary relations that exist between symmetry level and information's clarity−level, and these relations are based on what I call complementary−logic, which is based on included−middle reasoning, and both excluded−middle reasoning and fuzzy logic are limited proper sub−systems of it.

By my system we get these benefits:

[b:f306e071da]1)[/b:f306e071da] Each building−block has a unique internal complexity, that can be the basis for infinitely many unique building−blocks, which can be found upon infinitely many different scales.

[b:f306e071da]2)[/b:f306e071da] There are infinitely many unique internal structures that can be found in some particular scale level.

[b:f306e071da]3)[/b:f306e071da] There can be infinitely many complex structures, that are based on [b:f306e071da](1)[/b:f306e071da] and [b:f306e071da](2)[/b:f306e071da] building− blocks.

[b:f306e071da]4)[/b:f306e071da] These complex structures are much more accurate models then any model which is based on the quantitative−only standard number system, and some of the reasons are:

[b:f306e071da]a)[/b:f306e071da] The structure that is based on the complementary relations between symmetry and information concepts (where redundncy_AND_uncertainty are useful properties of them) is inherent property of my new system, and gives it the ability to understand the deepest principles of any dynamic/structural abstract or non−abstract complex object, without first reducing it to quantitative model (which is inevitable when we use the standard quantitative−only number system).

[b:f306e071da]b)[/b:f306e071da] The new natural numbers (which are now taken as topological information's building−blocks) are ordered as Mendeliev−like table, which gives us the ability to define their deep topological connections, even before we use them in some particular model.

These deep topological connections can be used as gateways between so−called different models, and expending our understanding about these explored models.

[b:f306e071da]c)[/b:f306e071da] My number system is the first number system, which is based on our cognition’s ability to count, as an inherent property of the abstract concept of a number.

By this research I have found and described how the number concept is based on the interactions between our memory and some abstract or non−abstract elements.

Through this approach our own cognition is included in the development of the Language of Mathematics, and we are no longer observers, but full participators where our own congenital abilities are legitimate parts of the mathematical research itself.

[u:f306e071da]For example:[/u:f306e071da]

What is called a function is first of all a reflection of our memory on the explored elements.

A function is the property that gives us the ability to compare things and get conclusions that are based on this comparison.

If something is compared by us to itself, we get the self identity of an element to itself by tautology (x=x).

If more then one element is compared, then we get several information clarity degrees that describe several possible interactions between our memory and the explored objects, and these several possible interactions can be ordered by their internal symmetrical degrees.

In this case multiplication and addition operations are complementary operations, where multiplication can be operated only between identical elements (redundancy_AND_uncertainty > 0) and addition is operated between non−identical elements (redundancy_AND_uncertainty = 0).

Because any function (which is not based on self reference of an element to itself) is a connection between at least two elements, its minimal abstract model cannot be less then a pointless line−segment, which is used as a connector between the examined elements.

In this case no interval (memory) can be described in terms of points (objects) and vise versa, and we get these four independent building−blocks of the language of Mathematics (which now includes the mathematician’s cognition−abilities as a legitimate part of it):

{}, {.}, {._.}, {__}

By this new approach we can build, for example, a totally new Turing−like machine, that can change forever our abilities to deal with complexity which is based in simplicity.

Please look at my website [url]http://www.geocities.com/complementarytheory/CATpage.html[/url] if you want to understand more.

Let us examine some different interpretations between my approach and the conventional approach:
>
> *[b:f306e071da]Doron:[/b:f306e071da]*
>
> *If we take care only about the integers, then [3,4]<[2,5], but if* we "dive in" to the fractal structure of infinitely many sub−intervals, then [3,4]=[2,5].
>

>
> *NialScorva (A memeber of another forum):*
>
> *Why is [3,4]<[2,5] for integers? I'm not asking to compare the* lengths, but rather the intervals themselves. If I highlight from 3 to 4 on the number line in blue and from 2 to 5 in red, which highlight is greater than the other? Normally you could say that one number is greater if it's further down the positive side, but both are further down the positive side than the other in some ways.
>

[b:f306e071da]Doron:[/b:f306e071da]

The main idea behind the integers (unless we choose to change it) is to look on the number line as if it has a one and only one scale factor, which its value is 1 and only 1.

In this case any arbitrary interval cannot be but 1 (or −1 if we take zero's left side).

For example:

..___−2___−1___0___1___2___[color=Blue:f306e071da]3___4[/color:f306e071da]___5___6___...

..___−2___−1___0___1___[color=Red:f306e071da]2___3___4___5[/color:f306e071da]___6___...

[color=Blue:f306e071da]3___4[/color:f306e071da] <
[color=Red:f306e071da]2___3___4___5[/color:f306e071da] −−>
[3,4]<[2,5] by the new approach.

By this approach no proper subset of N can be put in 1−1 correspondence with the entire N, for example N and its odds:

..___1___2___3___4___5___6___7___8___9___... (Entire N)
    |||||
..___1_______3_______5_______7_______9___... (Entire Odds)

In the standard way the interval {.__.} is omitted and we get:
[code:1:f306e071da]
.. 1 2 3 4 5 6 7 8 9 ... (Entire N)
   |||||||||

.. 1 3 5 7 9 11 13 15 17 ... (Entire Odds)
[/code:1:f306e071da]
As we can clearly see, standard math does not find 1−1 map between numbers, but between their represented notations, and we can clearly see that the standard point of view does not distinguish between a number and its represented notation.

Also:

2 <−> 3
5 <−> 4

and in this case (where {._.} is omitted) [3,4] = [2,5] by standard math.

−−

When [3,4] and [2,5] are taken as R members then the inifinitely many elements that exist between 3 to 5 and 2 to 5 in infinitely many different scales, can be put in 1−1 and onto, and in this case [3,4]=[2,5] because of the duality of each R member, which is clearly explained here:
[url]http://www.geocities.com/complementarytheory/No−Naive−Math.pdf[/url]

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Infinitely many elements in infinitely many scales have bigger cardinality then infinitely many elements that can be found in a one and only one particular scale (scale 0 is excluded in both cases).

Therefore |N|<|Q|<|R| where each number is at least {.}_AND_{._.} (as can be seen in [url]http://www.geocities.com/complementarytheory/No−Naive−Math.pdf[/url]).