

Re: Relative Cardinality

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- *From:* Virgil <ITSnetNOTcom#virgil@xxxxxxxxxxx>
 - *Date:* Sun, 17 Jul 2005 14:40:50 -0600
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In article <1121616174.789902.256110@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, mueckenh@xxxxxxxxxxxxxxxxxxx wrote:

>
> The power set of the set of all sets does not exist.

The "set" of all sets does not even exist in many axiom systems for set theory.

> We are in the comfortable situation that, contrary to oil, food, and
> water, the bits have not yet become scarce.
>
>>
>> Then define it. If there's no definition, it's worthless from a
>> mathematical point of view (and you may as well move your posts to
>> alt.fan.numerology).
>
> I have already defined: A natural number exists if there is a
> fundamental set or if there is an n-adic representation realized.
>>
>> This is not true. You are confusing a property of the set with a
>> property of its elements. The `_set_ {Berlin, 23, Mars}` is finite, but
>> you'd (presumably) never say that the `_element_ Berlin` is finite.
>>
>> The `_set_ {1, 2, 3, ...}` in standard number theory is `_infinite_`, and
>> its `_elements_` are all `_finite_`.
>
> That example does not fit the problem. N consists of elements which,
> contrary to Berlin,
> 1) are ordered
> 2) count their initial segment.
>
>>
>> Infinite means, literally, not finite.
>
>
> Yes. But not actually infinite. Actual infinity is a number (a whole
> number according to Cantor).

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Which infinity is a number according to Cantor? There are all sorts of infinities, and they need not all be numbers.

> Now draw the graph of a simple function $f(n) = n$ where n represents the
> natural numbers and $f(n)$ the numbers $\{1,2,3,\dots,n\}$. This function is
> the diagonal of the first quadrant of the Cartesian co-ordinate system.
> As long as infinity is not actually reached by n it is not reached by
> $f(n)$ and vice versa.

>
>>
>

>> Knowing all the digits of the real numbers can be done with arithmetic
>> (the standard long division algorithm, where you find the integer part
>> of the first number, the integer part of the second number, and quit if
>> they're not equal; otherwise, find the tenth digit of the first number
>> and the tenth digit of the second number, and if they're not equal, you
>> know which one is bigger; etc. If you have two different real numbers,
>> this procedure will terminate). This means that real numbers, as
>> defined in the standard real number system, exist.

>

> But it need not terminate before your means of writing down the
> integers is exhausted (including your personal memory).

>>

>> which means my point is valid; you do not know all the digits
>> 0.111... unless
>> you allow arbitrarily large numbers to exist. (I've also warned you
>> about the notation 0.111..., which in your number system is
>> meaningless, haven't I? I think so.)

>

> It is not meaningless. There are arbitrary many 1's. The limit is $1/9$
> because potential infinity is always sufficient for analysis.

>>

>> Okay, let's refine the question: You have a list of particles in the
>> universe in some order. You show up "at work", with all the 1's on the
>> particles, in the same order you've established. What number does the
>> universe represent?

>

> You show up at work in front of your screen. It is filled with 1's.
> What number does the screen represent?

>

> You need not write down all the 1's of the prime number 700 of the form
> 111...111. But it is sufficient to encode the information: All digits
> are 1, the number of digits is 10^{25} . As I have written down here. Only
> for numbers which do not follow any simple rule, like pi, we must write
> down all the digits.

>> There is actually a bit of regression here, once we talk about rules,
>> because the rules have to be interpreted. (The particles that have
>> 111...111 on them also include the particles that tell what the rules
>> are.) So you will need to say how to interpret 111..111 (on the "rule"
>> particles only) first.

>

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- > That is not a particular problem of mine. It is the same with
- > mainstream mathematics.
- >>
- >> All of this boils down to the following: There has to be some rule
- >> which is not written down. This rule should give you a unique
- >> interpretation for every possible representation, which may be simple
- >> or complicated, but you still end up with only 10^{100} Muecken numbers.
- >>
- >> If the unwritten (literally 8-) rule changes, the numbers you get can
- >> change, but how do you know which unwritten rule to use, unless it's
- >> written down on some particle? And once again we find that the number
- >> that the universe represents depends on some rule about rules (which
- >> rule do we use?) and what's written on particle X, which may as well
- >> have been stated as an unwritten rule in the first place.
- >
- > That is all the same with any representation of numbers.
- >
- >> How do you know consciousness in physically inside my head? Maybe it
- >> "leaks in" from some hyperspace. (This is an unsettled problem
- >> discussed by philosophers for centuries, so I don't really expect an
- >> answer. 8-))
- >
- > If you are a convinced solipsist you should never attend meetings.
- >>
- >>
- >> Geometry works with what are called "ideal objects": lines that have no
- >> width, points that have no dimension, etc. These objects do not exist
- >> in the physical world, so mathematics cannot be a part of physics.
- >
- > Reality supplies the stuff. A bit of abstraction is fine. But I am
- > sure, there is no ideal circle or rectangle in your head.
- >>
- >>
- >> Yes, they can; I can perform an algorithm to find any digit of $\sqrt{2}$
- >> in finite time.
- >
- > Then try to find out and store the first 10^{100} digits.
- >>
- >
- >> It is one possible measure for sets. Your "cardinality" is similar, in
- >> that it is one possible measure for sets as well. However, you should
- >> not have said that your "cardinality" is the same as traditional
- >> cardinality, unless you can show that, for any set S, the cardinality
- >> of S is the same as the "cardinality" of S. Only then would you have
- >> had the right to say your "cardinality" is the well-established
- >> cardinality.
- >
- > Cardinality was introduced as a measure of the number of elements. And
- > when introducing it, Cantor mentioned something like clear thought. That
- > is also the foundation of my definition.
- >>

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>> In an example which is probably clearer, I could decide to start
>> calling an apple a banana. There's nothing wrong with this, until I
>> start talking with other people about fruit. There, my statements that
>> "some bananas are red" and "bananas are nearly round" make no sense,
>> even though they are perfectly okay from my point of view. This
>> confusion results from using standard terminology in a non-standard
>> way.
>>
>>> Cantor defined it by "our thinking".
>>> He then used bijections to measure it but did not explain why.
>>
>> That's the definition of standard cardinality. It's just like saying
>> that 3 is an abbreviation for $1 + 1 + 1$. Why is "3" defined this way?
>> You tell me, and you'll understand why Cantor used bijections.
>
> I have proved tha there are not more irrational numbers than rational
> numbers.
>
>>
>> Which in particular don't exist? In particular, what is the smallest
>> value of N such that 1, 2, 3, ..., N are numbers, but N+1 isn't?
>
> How far does our atmosphere stretch out into the space? Please answer
> in millimeters.
>>
>>>> When real numbers were defined (based on sequences of rational
>>>> numbers), great care was taken to show when two of these resulting real
>>>> numbers are the same and when they are different.
>>>
>>> In order to define pi by a sequence there is the necessity to show that
>>>
>>> $|a_n - \pi| < \epsilon$
>>> for any positive epsilon.
>>
>> (You've mixed up quantifiers here. Pi can be defined by a sequence of
>> rational numbers a_n , but the condition on this sequence is that for
>> every positive epsilon, THERE EXISTS AN N such that $|a_n - \pi| <$
>> epsilon when $n \geq N$. The value of N changes when epsilon changes; you
>> do not need to have $|a_n - \pi| < \epsilon$ for all n and for all epsilon.
>
> You misunderstood me. Perhaps my fault. It must be possible to satisfy
> this inequality for arbitrarily small epsilon. But already for the
> comparatively large $\epsilon = 1/10^{10^{100}}$ this inequality cannot be
> satisfied by any a_n .
>
> Regards, WM
>

• *Follow-Ups:*

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◇ From: mueckenh

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