

# Re: Relative Cardinality

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- *From:* [mueckenh@xxxxxxxxxxxxxxxxxxxx](mailto:mueckenh@xxxxxxxxxxxxxxxxxxxx)
  - *Date:* 13 Jul 2005 02:44:39 -0700
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Proginoskes wrote:

> mueckenh@xxxxxxxxxxxxxxxxxxxx wrote:  
>> Proginoskes wrote:  
>>  
>>> Let me digress for a moment:  
>>>  
>>> Lemma. If we can't count up to N, then we can't count up to N-1.  
>>>  
>>> Proof: This statement is equivalent to: If we can count up to N-1, then  
>>> we can count up to N. This is trivially true.  
>>  
>> No. Use, as a simple model, three chips. How far can you count and  
>> store the result by means of these chips? 1, 2, end. In order to store  
>> 3, you must forget 1 and 2. Now turn the whole universe into a big  
>> computer. The principle remains the same, the numbers get larger  
>> though.  
>  
> That's right, you're not allowing any numbers with more than  $10^{100}$   
> digits, because you can't write them down in the real world. How  
> pathetic; you haven't even scratched the surface in what numbers are  
> allowed outside this universe.

I call  $10^{10^{10^{10^{10}}}}$  a number. In fact it is one of the smaller numbers.

>  
> (Comment added later: The hydrogen atom has an infinite (countable)  
> number of stable energy states. Any amount of energy can be created, as  
> long as it's "paid back" a short time later, so you can store one of a  
> countable number of natural numbers in one atom.)

And how can we measure these states? How can we enumerate them? If we measure an amount of energy, how can we map it on the due number? Your proposal would require by far more matter to represent numbers than the simple spin computer.

>  
>

## Re: Relative Cardinality

> Every natural number is finite, since it only has a finite number of  
> digits. But there are an infinite \_number\_ of them.

There are finite natural numbers which have more digits than any given number  $n$ , namely  $n+1$ ,  $n+2$ , ... According to your definition of infinity, the digits of natural numbers form an infinite set.

Or do you mean the set of digits is infinite? Of course, if there are infinitely many numbers, then the set of digits is infinite.

Or easier: Use the unal system, where 7 is represented by IIIIII.  
There are infinitely many natural numbers, but there are only finitely many strokes?

>  
> Actually, they don't by \_your\_ definition of a natural number (it has  
> to be less than  $10^{10^{100}}$ ). The definition of natural number allows  
> more digits than yours does.

You did not understand my definition. Please refrain from discussing it. The numbers have no upper limit.

> I figured everyone would know there was a 8-) at the end of that  
> sentence.

I don't understand what a 8-) should mean. However, I understand what Euclid meant and what he said.

>  
> What do you mean by a "simple rule" ?

A rule which does not consume much information or negentropy.

>  
>>> If that's what you've really meant, then you should have said so,  
>>> instead of wondering about whether numbers of the form  $111\dots111$  give  
>>> you infinitely many primes, since you won't be able to write them down  
>>> anyway.

>>  
>> Not write them down, but I would know each digit of that number.

>  
> You need to record the number of digits in the number  $111\dots111$ ,  
> though, because 11 and 111 differ only in the number of digits. That  
> means you can't deal with numbers with that "simple rule" which are  
> larger than  $10^{10^{10^{100}}}$ .

If I know that all their digits are 1, then this is sufficient.

>  
> But this means that, if you came upon the number  $N (> 1)$  written among  
> all the particles in the universe, how do you decide whether it's meant  
> to be  $N$  or  $111\dots111$  (with  $N$  digits)?

That must be fixed by definition like every numeral system.

>

## Re: Relative Cardinality

> This means that your system of recording numbers on particles is not  
> "well-defined", because you can get more than one number out of a  
> single representation.

111 can be interpreted as 3 or as onehundred and eleven. It must be defined what is meant.

>  
>> Therefore, for any other number I could find out which of them is  
>> larger. This is the criterion of existence for a "measure of  
>> largeness", i.e., a number.  
>  
>>> Mathematics was designed to work outside of the physical universe.  
>>  
>> Nothing does work outside of the physical universe.  
>  
> How can you be sure of this? All the physics that has been developed  
> has been for use in this universe, based on observations and trying to  
> come up with a system that fits those observations.  
>  
> There's no problem with my statement, because I included the phrase  
> "was designed to."

It was not designed to work outside. Geometry was designed to measure land, arithmetics was designed to count cattle. Nothing could be designed to work outside, because there is no outside.

>> Those numbers do certainly exist.  
>  
> So you've stated that there are numbers that exist that you can't write  
> down.

Numbers are conceivable, that could be raised into existence but which do not yet exist. Others, although called numbers by present mathematics, cannot exist and, therefore, are erroneously called numbers.

>  
> But this has been your point throughout the discussion. So you've  
> contradicted yourself here.

Where?

>  
>> But how would you satisfy the  
>> set-theoretic requirement that each element must be distinguished by at  
>> least one property from its companions? With less than  $10^{100}$  particles  
>> in the whole universe?  
>  
> I don't need to follow the second requirement with "my" mathematics,  
> which is the point of the whole thread. \_You\_ need to tell me this,  
> because you've insisted on it.

Set theory, i.e., your mathemaics, requires that the elements of a set

must be distinguished. Only now where you recognize that this task is impossible for infinite sets, you react defiant. But this recognition will spread out nevertheless.

Regards, WM

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• *Follow-Ups:*

- ◆ ***Re: Relative Cardinality***  
◇ *From:* Proginoskes

• *References:*

- ◆ ***Re: Relative Cardinality***  
◇ *From:* mueckenh
- ◆ ***Re: Relative Cardinality***  
◇ *From:* Virgil
- ◆ ***Re: Relative Cardinality***  
◇ *From:* mueckenh
- ◆ ***Re: Relative Cardinality***  
◇ *From:* Dik T. Winter
- ◆ ***Re: Relative Cardinality***  
◇ *From:* mueckenh
- ◆ ***Re: Relative Cardinality***  
◇ *From:* Randy Poe
- ◆ ***Re: Relative Cardinality***  
◇ *From:* mueckenh
- ◆ ***Re: Relative Cardinality***  
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