

Re: .99999... still=/= 1

Source: <http://sci.tech-archive.net/Archive/sci.math/2004-12/9649.html>

From: Tapio (hurmecom_at_dlc.fi)

Date: 12/21/04

Date: Tue, 21 Dec 2004 20:03:39 GMT

"Dave Seaman" <dseaman@no.such.host> wrote in message
news:cq9kr4\$vtj\$1@mailhub227.itcs.purdue.edu...

> On Tue, 21 Dec 2004 15:45:34 GMT, Tapio wrote:

>

>> "Dave Seaman" <dseaman@no.such.host> wrote in message

>> news:cq7ohu\$vlf\$1@mailhub227.itcs.purdue.edu...

>>> On Mon, 20 Dec 2004 20:46:26 GMT, Tapio wrote:

>

>>>> "Dave Seaman" <dseaman@no.such.host> wrote in message

>>>> news:cq4d8t\$4vm\$1@mailhub227.itcs.purdue.edu...

>

(snip)

> I don't know what you mean by an "infinite area" or by a "placeholder".

Perhaps it does not help to read my emails carefully. :-(

(snip)

>> OK, let's try again. First of all, I think we should start a new thread

>> from

>> the beginning so that everything is constructed and we use the same

>> concepts

>> and definitions.

>> I) ...999 is not N as it is not in a classic way finite integer. Let's

>> call

>> it infinite integer (N_{inf}) over one infinity.

>

> As far as I am concerned, "...999" does not mean anything at all. It has

> no connection with NSA or anything else as far as I can see. You keep

> throwing that string around as if you think it has a meaning, but you

> have never said what that meaning is.

If You and I can define it, as I have hopefully done, then there is a
meaning and a connection to the existing mathematics!

> I am not aware of any useful way of representing the members of $*N$ as

> decimal digit strings. Any scheme I can think of suffers from one of two

- > *defects: either there are members of \mathbb{N} that don't fit into the naming*
- > *scheme at all, or the coding scheme is so cryptic that you can't even*
- > *compare the sizes of two numbers just by looking at the digits.*

I think there is now something misunderstanding, of course I take the reason. \mathbb{N} is (infinite) integer part, what ever You like to call it. I have a feeling that we have to start from the premisses.

- > *Perhaps you can think of some scheme that I have overlooked, but you will*
- > *have to define your terms very carefully before I will be convinced.*
- >
- >> *2) I define it as I have done earlier sum $(k \ 0 \rightarrow \infty) 9 \cdot 10^k$.*
- >
- > *That sum diverges, even in NSA. It is not a number.*

Yes, from Your point of view, because You have not recognized that this diverging sum indeed have a limit as You consider a new point of reference. As You or I write $9/10^{-k}$ or as I write $9 \cdot 10^k$, then k (as integer in \mathbb{N} or \mathbb{N}) refers to some point of reference. Sorry, if this is so difficult.

- >> *It does not*
- >> *have classic limit as the k refers now the standard point of reference,*
- >> *but*
- >> *it has a limit as you hopefully noticed as we have another point of*
- >> *reference.*
- >
- > *There you go with your "point of reference" again. Sorry, but you can't*
- > *use one undefined term to define another.*

The point of reference is the counting point of reference. Everything is compared to some point of reference.

- >> *3) It is defined and it exists, now – how do You like to name it?*
- >> *Hyperinteger or something else?*
- >> *(snip)*
- >
- > *It's a string of digits. Nothing more. It is not a number at all, at*
- > *least in any sense that you have yet defined.*

I assume, because You cannot see the limit? There is no number if there is no limit? Do You think so?

- > *And now, I would like to ask a counter-question. I will describe a*
- > *certain member of \mathbb{N} , and I would like you to tell me what decimal digit*
- > *string you think corresponds to it. First, some background.*
- >
- > *You may recall from other discussions that the (standard) real numbers*
- > *can be defined as equivalence classes of Cauchy sequences of rationals.*
- > *That means I can identify a real number by presenting you with a Cauchy*
- > *sequence, and it is understood that any other sequence that happens to*
- > *fall into the same equivalence class is an equally good representation of*

- > that number. For example, the sequences
- >
- > $\langle 9/10, 99/100, 999/1000, \dots \rangle$
- > and
- > $\langle 1, 1, 1, 1, \dots \rangle$
- >
- > happen to be two different representations of the same real number.

Yes, within the concept of the limit calculation. But that is not true (this is my point of argumentation, which I have to explain for You) the sum is not the same as the limit. The limit is the successor of the sum. As You do not – yet – accept my argumentation, I have to explain it more clear for You, though my personal opinion is that I have done it already. Sorry – this seems to be more complex than I expected. :-(

- > Now, let's consider a similar construction that lies at the heart of
- > nonstandard analysis. To describe a member of *N , for example, I can
- > present you with a sequence of natural numbers (members of N). Unlike
- > the real-number construction, this one doesn't require the sequences to
- > be Cauchy. Technically, I also need to describe to you the equivalence
- > relation that will be used, but that's a bit more complicated. It
- > involves something called a free ultrafilter on N . You can find an
- > explanation of the concept at
- > <http://mathworld.wolfram.com/Ultraproduct.html>.

I have a strong feeling that we are talking about much very more simpler things. Your ultrafilters are me very strange matter. I'm very sorry. :-(

- >
- > For our purposes, it's enough to know that if I give you a sequence in N ,
- > there is a unique member of *N that is represented by that sequence. Ok
- > so far?
- >
- > Here is the sequence I have in mind. Let $A(x,y)$ be the Ackermann
- > Function, as described at
- > <http://mathworld.wolfram.com/AckermannFunction.html>. Now, let $a_k =$
- > $A(k,k)$ for each k . This sequence starts out:
- >
- > $a_0 = A(0,0) = 1$
- > $a_1 = A(1,1) = 3$
- > $a_2 = A(2,2) = 7$
- > $a_3 = A(3,3) = 2^6 - 3 = 61$
- > $a_4 = A(4,4) = 2^{2^2^2^2^2^2} - 3 =$ (too big to write out here)
- >
- > and after that the sequence starts to grow rather quickly. :-(
- >
- > Let a be the member of *N that is associated with this sequence. My
- > question is:
- >
- > (1) what decimal digit string do you think represents a ?
- > (2) what decimal digit string do you think represents $A(a,a)$?

>
> *My point is that your decimal digit strings are woefully inadequate in*
> *this context. They cannot even begin to describe the numbers in $*N$ in*
> *any useful way.*

Huh! I'm indeed totally out! Sorry. I have NOT described something so complicated like that. I cannot give You an answer. I assume we have now a very strange vision what I have told before.

>> (snip)
>
>>> *In a similar fashion, you keep assuming that I must know what you mean*
>>> *by*
>>> *...999. However, I assure you that I don't.*
>
>> *Uh! I have tried to explain so simple as possible. I had once a feeling*
>> *that*
>> *You understood very well.*
>> *There must be some miscommunication.*
>
> *Answer my questions (1) and (2) above, and then we'll see whether there*
> *is any purpose at all in discussing decimal digit strings in connection*
> *with $*N$.*

The only possibility is to talk about limit of those expressions as we change the point of reference, but I cannot see Your goal.

>>> (4) *It is not possible to sum over N in NSA, because N is*
>>> *not a set in NSA.*
>
>>> *Do you agree?*
>
>> *I agree 1,2 and 3 but in the case 4 I disagree. Maybe we have to discuss*
>> *about that topic more accurate. I consider finite integers are a subset*
>> *of*
>> *infinite integers over the first one infinity.*
>
> *Each of the finite naturals is a member of $*N$, but it does not follow*
> *from this that N is a subset of $*N$. That's part of why it's called*
> *"nonstandard" analysis. Not everything is a set in this model.*
>
>>> ????
(snip)
>> *I cannot see where the transfer principle fails, except in the case of*
>> *sum*
>> *and limit. But in this case there are natural reasons as I have tried to*
>> *explain. And the reason is not NSA.*
>
> *Let's consider the case of $*R$, for example. We know $*R$ is the extension*
> *(the "enlargement") of R .*

Yes, but You may have different vison?

- > *We also know that R satisfies the least upper*
- > *bound property.*

Yes, as and if I consider the limit and the sum of the string.

- > *By the transfer principle, *R must satisfy the least*
- > *upper bound property.*

As every limit.

- > *However, we also know that the collection R of*
- > *finite reals is nonempty and is bounded above in *R by any infinitely*
- > *large number.*

Now You talk about reals with infinite integers and plus fractional part?

- > *But R does not have a least upper bound in *R , because if*
- > *x is infinitely large, then so is $x-1$.*

No, because there is an exception. The limit of *R comes on or against at $x+1$ as all the placeholders were totaly occupied with the maximal digit within the choosen base system!

- > *The conclusion is that R cannot*
- > *be a set in NSA. The least upper bound principle is preserved because it*
- > *applies only to nonempty * subsets * of *R that are bounded above, and R is*
- > *not a * subset * at all.*

Here our opinions needs further to discuss. :-)

Tapio

- >> *(snip)*
- >
- > --
- > *Dave Seaman*
- > *Judge Yohn's mistakes revealed in Mumia Abu-Jamal ruling.*
- > *<<http://www.commoncouragepress.com/index.cfm?action=book&bookid=228>>*