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

Source: http://sci.tech−archive.net/Archive/sci.math/2004−12/9657.html

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From: Dave Seaman (*dseaman_at_no.such.host*)
Date: 12/21/04

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Date: Tue, 21 Dec 2004 20:30:38 +0000 (UTC)
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On Tue, 21 Dec 2004 20:03:39 GMT, Tapio wrote:

> "Dave Seaman" <dseaman@no.such.host> wrote in message
> news:cq9kr4vtj1@mailhub227.itcs.purdue.edu...

>> 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. :−(

I have not received any email from you.

>> 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!

You have not defined ...999 except to say that it means sum_n 9*10^n, which is nonsense. Are you forgetting the transfer principle? That sum diverges in standard analysis (summing for n in N), and therefore it also diverges in NSA (summing for n in *N). Sorry, but you have not defined anything.

> It think there is now something misundertanding, of course I take the
*> reason. *N is (infinite) integer part, what ever You like to call it. I have*
> a feeling that we have to start from the premices.

That's exactly what I did when I explained about equivalence classes of integer sequences. That's as basic as it gets in NSA.

>> And now, I would like to ask a counter−question. I will describe a
*>> certain member of *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

>> < 9/10, 99/100, 999/1000, ... >
>> and
>> < 1, 1, 1, 1, ... >

>> 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 that 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 taking about much very more simpler
> things. Your ultrafilters are me very strange matter. I'm very sorry. :−(

As I explained, you don't need to know what an ultrafilter is in order to grasp the basic point of the example. We have a hyperinteger, a member of *N, that is described by a particular sequence. By the way, since the terms of the sequence are unbounded, we can conclude that the associated hyperinteger is infinitely large.

>> 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 totaly out! Sorry. I have NOT descibed 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.

That's the very point I was trying to make. You have been talking about infinite strings of digits, under the mistaken impression that you were talking about hyperintegers. The whole point of my description above was to show that hyperintegers are not even remotely like what you thought they were. Your decimal digit strings are most certainly not hyperintegers. As far as I can see, your digit strings are not numbers, they have no interesting properties, and they are not worth discussing at all.

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