Re: Cantor Confusion

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- *From*: mueckenh@xxxxxxxxxxxxxxxxx
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On 30 Mrz., 05:14, "Dik T. Winter" <Dik.Win...@xxxxxx> wrote:

> > > > No, the sum is undefined. If you think it is defined, *prove* it and
> > > > *prove* that the sum is 2. What is the sum of the "sequence":
> > > > "..., 1/4, 1/2, 1"?
> > >
> > > Well, what is it? If any infinite series ever had a value, then the
> > > sum of this sequence is 2.
> >
> > But it is not a sequence according to mathematical definitions.
>
> It is a sequence according to mathematical definitions, if you read it
> from the left hand side.

Oh, that should read "from the right hand side"! But you read it as it
was meant.

> So there is a first element, being 1, a second element, being 1/2, the only
> difference is that you apply right to left reading.
>
> > Further you can determine a unique limit value by lim{n−−>oo} (1/2^n
> > + ... + 1/8 + 1/4 + 1/2 + 1}.
>
> Yes, because you can revert finite sequences without consequence. You
> do not even need convergence for that.

And if the series is absolutely converging, then you can exchange all
terms you like. The result is independent of the order.

> But in mathematics sequences
> are defined as having a first element. On the other hand, I wonder how
> you prove that the series of interchanges on the initial sequence lead
> to your final "sequence".

It is the same as Cantor's "proof" that he gets ready.

> > > Proof: Sum the first n terms from the right hand side and find that
> > > the difference of their sum and 2 is not more than 1/2^(n−1). Further
> > > find that the sum is always less than 2. Voila.
> >
> > Ok, what node contributes '1' to that sum? I ask this because you want it
> > to apply to nodes contributing things to a path.
>
> You know, this node cannot be determined. Therefore I use the limit
> (which does exist):
> lim{n−−>oo} (1/2^n + ... + 1/8 + 1/4 + 1/2 + 1} = 2

Yes, you use limits to show something which you can not determine. The
strange thing is that the first node contributes nothing, as does the
second nodes, as do all nodes in a finite distance from the root. And
as all nodes in an infinite path are a finite distance from the root.
Nevertheless you maintain that all nodes together contribute 2 because
there is no node that contributes one, there is no node that contributes
1/2, etc. So there is a sequence of no nodes that contribute 2. And in
some mysterious way you conclude that that sequence of no nodes is the
same as the sequence of nodes.

Take the geometric series. It contains exactly the same terms as my
reverted series.

> > > > Yes, and when are we done?
> > >
> > > When is Cantor done?
> >
> > Well, at each step in the reversal process you have a sequence with a first
> > element and no last element. I do not know of a way to define what the
> > result is after infinitely many steps.
>
> Do you know of a way how to finish Cantor's diagonal?

Is there any need to finish it at all?

Yes, if you want to conclude that it is different from any other list
entry, then it must be finished. Otherwise you only know that it
differs from some entries.

Apparently you see a need to finish
it. For the proof it is only needed to show that there *is* a real number
that is not on the list. The algorithm that describes that real number is

sufficient.

You cannot say: "there is a real number that is not in the complete
list" unless you have searched the complete list.

> > What is the first element after
> > infinitely many steps? And how do you define that at all? Or is your
> > definition simply that it is {..., 3−rd term, 2−nd term, 1−st term}?
>
> My definition is that every finite part of the sequence can be
> reversed. "Every finite" part of a countable set means "all" − this is
> just like in Cantors diagonal.

You are wrong here. And what you state is *not* a definition. Pray start
to distinguish "definition" from "theorem".

That distinction depends on the axioms chosen. It is not absolute.

"Every finite part" means
just that: "every finite part", it does not apply to "infinite parts",
which is "all". On the other hand with Cantor we have "every finite element"
and that means "all elements", because there are no "infinite elements".

> > > Ever tried to count the students attending a lesson or the peas in a
> > > cup full of peas?
> >
> > Why should I? To perform the n−th exchange in Cantor's process you do
> > *not* have to do the first n−1 preceding exchanges first.
>
> How would you know which element the n−th element is.

By putting n in the mapping given.

The mapping given includes and requires the counting. (That reminds me
of an anti−nuclear−power−station fighter who argued: We don't need
power stations, our electricity is supplied by the electrical outlet
at home.)

>
> Therefore we know that only countably many are there.

A proof, please, for once.

Every separation takes place at a separation point. No separation takes place at any other point. There are only countably many separation points. And there is only one initial separate path.

Regards, WM

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