Re: Cantor Confusion

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- *From*: "Dik T. Winter" <Dik.Winter@xxxxxx>
- *Date*: Fri, 30 Mar 2007 03:14:36 GMT

In article <1175177285.625501.231650@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx>
mueckenh@xxxxxxxxxxxxxxxxx writes:

> On 29 Mrz., 04:03, "Dik T. Winter" <Dik.Win...@xxxxxx> wrote:
>
>> In article <1175104726.767746.12...@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx>
>> mueck...@xxxxxxxxxxxxxxxxx writes:
>>
>> > On 26 Mrz., 16:58, "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.

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. 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".

> 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.

> > 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? 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.

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". "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 woud you know which element the n−th element is.

By putting n in the mapping given.

Or do you think
you can do your exchanges all at once?

I do not think it, I know it. It is ridiculous to claim you could do
infinitely many exchanges simultaneously.

These two sentences are in contradiction with each other.

> > You have to first *prove* your statement that there is not an
> > uncountable number of separated paths. Until now your proofs
> > depend crucially on the assertion that there is not an uncountable
> > number of separated paths, and so are circular.
>
> Wrong. The proof depends on the fact that the set of nodes is
> undisputedly countable and only nodes are points of separation. A very
> simple logical conclusion, in principle.

So, please, prove it, using simple logic.

1 + 1 = 2. Good so?

A singular lack of logic. That is not a proof of your statement. Do you
know how to construct proofs?

> There is no *finite* level where all paths are separated. But the tree
> is *infinite* and it contains all levels where something could happen.
> A path which is not separated form another one within the tree is
> never separated.

Yes, you are not contradicting what I state. Each path is separated from each other path.

Therefore we know that only countably many are there.

A proof, please, for once.

> You should say, however:
> For every pair of path, there is a node in finite distance from the
> root node, where they separate. There is no node in finite distance
> from the root node where all have separated.

The same problem here. But if you correct again the "no node" to "no level" I would agree, and I have stated such already quite some time.

So we both agree.

Yes, on this statement, *when* it is adapted.

> And you should recognize
> that the binary tree is infinite. Therefore, everything that happens
> even *after* any finite distance from the root node, nevertheless
> happens in the tree − unless it does not happen at all.

Nothing happens after any finite distance. There is *no* level where all paths are separated from each other. Why you think that there should be such a level escapes me.

It is very simple. Every digit of a real number is indexed by a finite natural number. Every due level is in the tree.

Yes, so what? It still escapes me.

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