Re: Ultimate debunking of Cantor's Theory

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- *From*: Calvin <crice5@xxxxxxxxxxxxxx>
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On Jul 13, 2:03 am, "Peter Webb"
<webbfam...@xxxxxxxxxxxxxxxxxxxxxxxxxx> wrote:

> What Prog said is quite true. He just picked an example which (whilst
> correct) is probably a little bit too clever.
>
> He hasn't claimed that you can write down a list of all Reals in base 2. He
> claims that the Cantor diagonal argument cannot be used in base 2 to prove
> this.
>
> Here is a somewhat clearer example.
>
> Imagine the list is:
>
> a(1) = 0.011111 ...
> a(2) = 0.01
> a(3) = 0.001
> a(4) = 0.0001
> .
> .
>
> Form the diagonal by flipping bits. You get
>
> cantor diagonal = 0.1000000...
>
> But 0.0111... is the same number 0.1 (unless you also believe that 0.999...
> <> 1), and so the Cantor diagonal does appear on the list.
>
> Now we all know that the list above doesn't contain every Real, but the
> Cantor diagonal construction doesn't itself prove this to be true.
>
> (His example was a "bit too clever" because he set a(2) = a(3) = a(4) ....,
> which is quite valid but obscures his central argument).

My problem with what he did is not a failure to
understand that 0.0111... is the same number as 0.1;
I accepted that immediately.

My problem with it is that he produced a CONTRIVED list,
flipped the diagonal and said that the new number
thus produced is indeed already in the list. So
what?

That's not the sort of thing Cantor's argument is.
He takes a traditional reductio ad absurdum approach
and 'assumes' that what he wants to prove is not true.
If it were not true, then a countable list of decimal
(or binary) expansions of the reals between 0 and 1
could exist. He didn't say how such a list might be
generated. How could he? Why would he? He wants
to show that the existence of such a complete list
is impossible.

To make a simple analogy, if you are proving that
there is no rational number the square of which
is 2, you assume the contrary and posit integers p
and q in lowest terms, q not 0, for which the square
of p/q is 2. You don't claim to know what p and q
would have to be. That would be outrageously absurd,
since your motive is to prove that they don't exist
as posited.

I could be very much in sympathy with a complaint
against Cantor's diagonal argument that said it is
not acceptable to operate on the assumed impossible
list to the extent that he does in order to 'show'
that such a countable list cannot be complete.
I've always been uneasy about that. But the sort
of approach that Proginoskes uses to 'refute' Cantor
in the case of a list of binary forms of the reals
is an insult to everyone's intelligence, it seems
to me.

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