Re: Ultimate debunking of Cantor's Theory

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- *From*: Virgil <virgil@xxxxxxxxxxx>
- *Date*: Fri, 13 Jul 2007 18:14:01 −0600

In article <1184359083.974667.129640@xxxxxxxxxxxxxxxxxxxxxxxxxxx>,
WM <mueckenh@xxxxxxxxxxxxxxxxx> wrote:

> On 13 Jul., 21:38, Rotwang <sg...@xxxxxxxxxxxxx> wrote:
>
> > WM wrote:
> >
> > [Peter Webb]
> >
> > > > > When you do the Cantor trick in base 10,
> > > > > you can prove to yourself that
> > > > > it
> > > > > always produces a number not on the list.
> > > > > Even if you have 0.500..
> > > > > somewhere
> > > > > on the list, you can be certain that you will
> > > > > never get the same number
> > > > > in a
> > > > > different form, such as 0.49999.. as a result
> > > > > of the construction.
> > > > >
> > > > > If you could find a single example where the
> > > > > Cantor construction failed
> > > > > to
> > > > > produce a different number − if for example
> > > > > it generated 0.4999.. when
> > > > > 0.5
> > > > > was on the list − then you can no longer
> > > > > claim that the Cantor
> > > > > construction
> > > > > ALWAYS produces a new number.

Such an example is easy to find. Consider the list
0.0
0.1
0.11
0.111
...
and switch 0 to 1 on the diagonal. Then you have at the diagonal the
number 0.111..., but only if this number (with one digit less) is also
in the list.

The guy to whom you are replying has already given an example where the Cantor construction fails in base 2. However he was writing about base 10 above, and with a sensible definition of the construction it is impossible to find an example where the it fails to find a new number.

Cantor himself was writing about base 2, using the symbols w and m. But he did not clearly spell out that he meant real numbers.

Actually, Cantor clearly spelled out that his did NOT mean real numbers.

He only

talked about sequences. And for that case his proof was correct, because w.mmm... is not the same as m.www... while binary 0.111... = 1.000...

But even in binary, if one pairs off digits starting from the binary point, one can construct a rule by which for every list of such binaries there is an unlisted binary.

For example one can define the construction so that the decimal expansion it gives contains only the digits 4 and 7. The only way that two different decimal expansions can define the same number is if one of them contains an infinite string of 9's and the other contains an infinite string of 0's

> No. The example I gave shows also that the diagonal 0.111... is contained in the list:
>
> 0.0
> 0.1
> 0.11
> 0.111
> ...

But if one pairs off digits, your list is
00.00'00'00'...
00.10'00'00'...
00.11'00'00'...
00.11'10'00'...
.....

so replacing every pair byut 01 by 01 and replacing it by 10 works perfectly for Cantor and badly for WM.

> Of course you can state that the diagonal is an infinite sequence of 1's while every list entry is a finite sequence of 1's. But that does not help. Every finite number multiplied by 2 is also finite.

WM is only claiming that one particular rule does not work but cannot show that there are no rules which work because there ARE rules which work.

> Therefore any sequence of 1's of the list numbers is less than half as long as the sequence of 1's of the diagonal. Therefore the diagonal is at least twice as long as any sequence of 1's contained in the list, which is obviously nonsense.

Much of what WM argues for is nonsense. At least mathematically speaking.
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