Re: Cantor Confusion

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- *From*: mueckenh@xxxxxxxxxxxxxxxxx
- *Date*: 18 Dec 2006 07:16:15 −0800

William Hughes schrieb:

> mueckenh@xxxxxxxxxxxxxxxxx wrote:
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> > > > > > > > > mueckenh@xxxxxxxxxxxxxxxxx wrote:
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> > > > > > > > > > Virgil schrieb:
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> > > > > > > > > > > > (It is

contained in the union of all lines, but the union of all lines is not a line)

That is a void assertion unless you can prove it by showing that element by which the union differes from all the lines.

Not quite. In order to achieve that

the diagoal is not in any linem all that is required is: Given any line there is an element of the diagonal not in THAT line. It is not requires that: There is an element of the diagonal that is not in any line.

For linear sets you

cannot help yourself by stating that the diagonal differs form line A by element b and from line B by element a, but a is in A and b is in B. This outcome is wrong.

Therefore your reasoning "there is an element of the diagonal not in THAT line.

It is not required that: There is an element of the diagonal that is not in any line." is inapplicable for linear sets. You see it best if you try to give an example using a finite element a or b.

In every finite example the line that

contains the diagonal is the last line.

Every example with natural numbers (finite lines) is a finite example.

Your claim is that there is a line which contains the diagonal.

Because a diagonal longer than any line is not a diagonal.

Call it

L_D. Question: "Is L_D the last line?"

There is no last line

Then, there is a line that comes after L_D.

Therefore :L_D does not contain every element that can be shown to exist in the diagonal.

All elements that can be shown to exist in the diagonal can be

shown to
exist in one
single line.

Call it L_D

L_D contains a largest
element. n.

L_D is not the last line, so
there is
a line with element n+1,

Element n+1 can be shown
to exist in the diagonal.

Element n+1 can be shown to exist in L_D
(which is obviously a line
containing n+1).

No. L_D is bounded. The largest element of L_D is n.
L_D does not contain n+1.

You misinterpret L_D. L_D is that line which contains all numbers contained in the diagonal. If your L_D does not contain them, then you have the wrong L_D.

Assume that there exists an L_D which contains all the numbers contained in the diagonal. L_D is bounded,

If an unbounded diagonal exists, then obviously an unbounded line must exist.
The conclusion is false, so the antecedent cannot be true.

therefore there
exists a largest element, call it n(L_D). L_D is not the last line
therefore there exists a line containing n(L_D) + 1, therefore
the diagonal contains n(L_D) + 1, L_D does not contain n(L_D) + 1.
Contradiction. Therefore L_D does not exist.

I think you can agree to the statement:

The diagonal does, by definition, not contain any element which is missing in every line.

Now assume that at least two lines were required to contain all the elements of the diagonal. All the lines are finite, so one of them must be smaller than the other. Therefore the assumption that both were required is false.

You see we have two proofs with different results.

The only possible outcome is to withdraw the assumption of the existence of the diagonal.

Regards, WM

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