Re: Cantor and the binary tree

Source: http://sci.tech−archive.net/Archive/sci.math/2005−05/msg04496.html

- *From*: Tony Orlow (aeo6) <aeo6@xxxxxxxxxxx>
- *Date*: Tue, 24 May 2005 15:48:41 −0400

Ron Sperber said:
> Robin Chapman wrote:
> > Robert Kolker wrote:
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> >>mueckenh@xxxxxxxxxxxxxxxxx wrote:
> >>
> >>
> >>>of paths always equals that of the nodes + 1. It is simply impossible
> >>>to assume that one of these numbers becomes uncountably infinite while
> >>>the other remains countably infinite.
> >
> >
> > "becomes"? Muck's fuzzy metaphors are sabotaging him again.
> > The fact is that the nodes in this tree form a countable
> > set and the paths form an uncountable set. "becoming"
> > has nowt to do with that.
> >
> >
> >>Wrong. 2^(aleph_0) > aleph_0.
> >>
> >>List all the infinite binary sequences with a bijection to the integers.
> >>Now flip the n−th digit of the n−th sequence in the list. This cannot
> >>occur anywhere in the list. Contradiction. Such a bijection to the
> >>integers does not exist.
> >
> >
> > One can hardly imagine a simpler mathematical proof. Alas, it's still
> > beyond the limits of Muck's feeble intellect :−(
> >
>
> It simply boggles my mind that this simple proof gives so many people
> such fits that they refuse to accept it. I continue to be sadly shocked
> by the number of posts on sci.math daily refuting Cantor's proof. Of
> course they are always fuzzy on details, but that's to be expected since
> they can't actually disprove it.
>
My refutations have been airtight, despite claims to the contrary. You appear
to be referring to the "proof" of uncountability of the reals. it really only

proves that there are more reals than naturals, and that one can generate more strings than the number of symbols each string contains, provided you have a set of more than one symbol to choose from. By traversing the list diagonally and assuming you have covered the list, you are assuming that it is square in the sense that there are as many digits in each number as numbers in the list. But, digital number systems don't work that way. If you have a number system of base S, L digits will allow you to represent S^L numbers, so if you have N digits, you will have 10^N numbers in decimal, 2^N numbers in binary, in your list. It is infinitely longer than it is wide, and therefore cannot be completely traversed diagonally. The number generated in the antidiagonal is simply one of the 2^N−N numbers below the diagonal of traversal.

The subsequent conclusion that the reals are not "countable" rests on the notion that all countably infinite sets are the same size, which is an assumption that I reject for many reasons, and which has no justification besides "oo=oo=oo".

Sure, the proof looks simple. It's a little too simple, and the critical thought aimed at it is too.
−−
Smiles,

Tony
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- ***Follow−Ups***:
  - ♦ ***Re: Cantor and the binary tree***
    - ◊ *From:* Ron Sperber
  - ♦ ***Re: Cantor and the binary tree***
    - ◊ *From:* Robert Kolker

- ***References***:
  - ♦ ***Cantor and the binary tree***
    - ◊ *From:* mueckenh
  - ♦ ***Re: Cantor and the binary tree***
    - ◊ *From:* Robert Kolker
  - ♦ ***Re: Cantor and the binary tree***
    - ◊ *From:* Robin Chapman
  - ♦ ***Re: Cantor and the binary tree***
    - ◊ *From:* Ron Sperber

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