Re: Well Ordering the Reals

Source: http://sci.tech−archive.net/Archive/sci.math/2005−12/msg01667.html

- *From*: Tony Orlow <aeo6@xxxxxxxxxxx>
- *Date*: Wed, 7 Dec 2005 14:56:38 −0500

Virgil said:
> In article <MPG.1e00eacf5e99a95f98a84c@xxxxxxxxxxxxxxxxxxxxxxxxx>,
> Tony Orlow <aeo6@xxxxxxxxxxx> wrote:
>
> > Virgil said:
> > > In article <MPG.1dff9bce5e943ea898a82a@xxxxxxxxxxxxxxxxxxxxxxxxx>,
> > > Tony Orlow <aeo6@xxxxxxxxxxx> wrote:
> >
> > > > > > > > > Here is one more question: Imagine a "TO−number" with zeros
> > > > > > > > > from its left end rightward to the furthest extent covered
> > > > > > > > > by some known internal "limit point', and all 1's from
> > > > > > > > > there on rightward. What is its successor?
> >
> > > > > > > > A 1 where the rightmost 0 is, and 0's from there rightward,
> >
> > > > > > > But according to TO's own descriptions, there cannot be any
> > > > > > > such "rightmost" zero. To the right of any limit point (except the
> > > > > > > right end point) there is an unending sequence of digits each
> > > > > > > finitely far from that limit point, so there cannot be a "last"
> > > > > > > one.
> >
> > > > > >
> > > > > > Since we are talking about whole numbers, bits to the right of
> > > > > > the 0 point are all zeroes and ignored. So, I am referring to the
> > > > > > rightmost 0 that is left of the 0 point.
> > > > >
> > > > > TO is relying on the non−existent again. He is referring to the
> > > > > rightmost zero in an unending sequence of ever more rightward
> > > > > zeros, those which are a finite number of places to the right of
> > > > > the left end of TO's T−errible two−ended infinite string of digits.
> >
> > > > Okay, I don;t think I understood what you were saying. There always
> > > > seems to be this underlying assumption of finiteness buried in
> > > > statements about strings. So, okay, this is like the example I think
> > > > Dave Tribble offered, but in mirror image. So, let's see. So, we
> > > > didn't specify the limit point, so we'll call it N, for N bits
> > > > between it and the 0 point. Now, you want to say that the set of bits
> > > > finitely far from the top are 0's, and the rest 1's? Okay. We have N
> > > > bits, and the last aleph_0 are 0's (I don't have any number of finite

> > naturals, so I'll use yours for now). So we have N−aleph_0 1's, which
> > is 2^(N−aleph_0)−1. An interesting number, but probably not very
> > useful, with aleph_0. Still, if you want to consider sets of finite
> > naturals, you might as well call it something, I suppose.
>
>
> TO carefully avoids the issue to blather on about inconsequentials.
>
> In TO's system of "whole numbers", there is a most significant digit and
> a least significant digit and presumably an uncountable sequence of
> digits between. TO's "limit points" include both end digits.
>
> I can imagine a TO−number which has 0's in every position a finite
> number of places from the most significant place and 1's elsewhere.
> Since there is no least significant 0 or most sigificant 1 in such a
> TO−number, how does TO suggest finding its successor?
>
> That is my question. Try answering it, TO!
I did, below.
>
>
> > > But, as TO constructs them, there can be TO−strings staring at the
> > > left with 0, and having an endless string of 0's followed by
> > > infinitely many 1's.
> > Well, yes, and you would have your first 0 at bit N−aleph_0, and
> > invert the string from there rightward to increment it.
See?
>
> But there is always another less significant 0 after each 0 so there
> isn't any end to them ever.
Then your set of finite positions is not well defined nough to do much with,
which is what I've said since the beginning of all of this. You talk about a
complete set one minute, and then talk about a never−ending sequence the next.
You object whenever I talk about the sequence of naturals, and claim it's a
static set, but you bounce back and forth at your convenience. A little
consistency, please.
>
> > > There cannot be a rightmost 0 in such a number because there
> > > cannot be a largest finite natural.
> >
> > That's right, and that's why it doesn't really make that much sense
> > to talk about it, but if you want to, you can throw in your aleph_0.
> > I haven't found much use for it, personally.
>
> So that To's "solution" is a crock!

It certainly doesn't have much to do with aleph_0, which is a crock. Maybe
crockery is a little relative here, but no, that's the standard position. Ross
and I seek more of a universal context.

>

> >
> > >
> > > > >
> > > > > How can one locate the rightmost digit among a set of digits
> > > > > for which there is no rightmost?
> > > > To the left of the 0 point. These are whole numbers we're
> > > > incrementing right?
> > >
> > > These are TO−numbers, which makes them wholly illusional. But as TO
> > > described them, they have a leftmost digit, a rightmost digit,
> > > uncountably many digits in between in a sequential order. Have I
> > > misreprestened these TO−numbers in any way?
>
> > Yes, a little. They need to have a variable most significant bit for
> > infinite values and a variable least significant bit for
> > infinitesimals, but all digital number systems really have an
> > infinite unending string of bits, even if most are generally ignored.
>
> At least for standard systems of natural numbers, there is a most
> significant bit at a finite position, so that the set of zeros to the
> left of all non−zero digits always has a least significant postion.
True.
>
> This is not true for TO−wholes or TO−naturals, and that creates the
> anomaly that TO refuses to address,
Only when you insert your finite but unbounded set concept into it. Does it occur to you that that idea is the source of this problem? It's not one I ever included in my ideas.
> > >
> > > > Nope. I am saying the rightmost 0 to the left of the 0 point.
>
>
> > >
> > > Which does not exist (see above), because each 0 is followed by
> > > another 0, but all of them are followed by uncountalby many 1's.
>
> > That's okay. If you want to talk about the set of finite naturals,
> > you have to declare some limit point for that, which makes it seem
> > like an infinity, and yet as I said to Dave Tribble, it occurs to me
> > that limit points don't NEED to be infinitely far apart.
>
> If they are not infinitely far apart, you don't need them at all.
True. You can individually specify every bit in between. But, if there is a bit pattern that can express the intermediate substring, then it may be convenient to use such notation.
> > >
> > > It is TO's system, not mine, so he is the one responsible for this
> > > anomaly.
> > >
> > Yup.
>

> But TO cannot make it go away without admitting that his "number system"
> sucks.
Or dismissing aleph_0 as a valid concept. Bye bye, anomaly,
>

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Smiles,

Tony
http://www.people.cornell.edu/pages/aeo6/WellOrder/
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- ***References***:
  - ***Re: Well Ordering the Reals***
    - *From:* William Hughes
  - ***Re: Well Ordering the Reals***
    - *From:* Tony Orlow
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