Re: Well Ordering the Reals

Source: http://sci.tech−archive.net/Archive/sci.math/2005−11/msg00172.html

- *From*: stevendaryl3016@xxxxxxxxx (Daryl McCullough)

- *Date*: 1 Nov 2005 13:29:49 −0800

Tony Orlow says...
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>Daryl McCullough said:
>> Tony Orlow says...
>>
>> >I already defined finite, infinite and infinitesimal quantities, Daryl.
>>
>> For the record, give a definition of what it means for a set
>> to have an infinite quantity of elements. The closest you have
>> come is saying that 1/0 is infinite, but how does that apply
>> to sets? What does it mean for a set to have 1/0 elements?

>I said if it's not zero and not finite, which I explicitly defined, then it's
>infinite, as a quantity.

The question is what does "number of elements" mean
(to you, that is).

>I said this before, that the Dedekind definition of an infinite set as one
>which injects into a proper subset is valid, so long as you do not limit the
>elements in some way that causes them to only have finite indices in the set.

That doesn't make a bit of sense. If the Dedekind definition of "infinite
set" is valid, then it follows that the collection of finite naturals
is an infinite set. If you say that the collection of finite naturals
is *not* an infinite set, then you are rejecting the Dedekind definition.
So what definition are you using?

>The Peano axioms define an infinite set

They define a Dedekind infinite set. But what basis do you have
for believing that it isn't one of those funny "finite but unbounded"
sets?

>but when you restrict them to finite
>values, you make it impossible for the set to actually include an infinite
>number of numbers.

What does it mean to have an "infinite number of numbers", if you

don't mean Dedekind infinite?

>In general, an infinite set is defined by a recursive structure
>wherein every element has at least one successor in the set, and
>where the number of successor operations is actually an infinite
>number

What is an infinite number? Can you define infinite set without using the word "infinite"?

You talk about a "recursive structure" but what does that mean?

A recursive *definition* is one in which the thing being defined is used in the definition. For example, you are defining some object X and your definition is in terms of a function f:

X = f(X)

I don't know what you mean by a "recursive structure". Do you mean anything that satisfies a recursive definition?

>and not restricted to finite values. If we allow all finite
>iterations, but no infinite ones, then we have a boundless
>set which is nonetheless finite in scope. I hope that
>clarifies my position on the subject.

No, it doesn't. What is an infinite number? What is a recursive structure? If you are going to redo all of mathematics, you have to figure out what your primitive concepts are, and define everything in terms of those.

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- ***Follow−Ups***:
  - ♦ ***Re: Well Ordering the Reals***
    - ◊ *From:* Tony Orlow

- ***References***:
  - ♦ ***Re: Well Ordering the Reals***
    - ◊ *From:* Daryl McCullough
  - ♦ ***Re: Well Ordering the Reals***
    - ◊ *From:* Tony Orlow
  - ♦ ***Re: Well Ordering the Reals***
    - ◊ *From:* Daryl McCullough
  - ♦ ***Re: Well Ordering the Reals***