Re: Review of Mueckenheims book.

Source: http://sci.tech−archive.net/Archive/sci.math/2007−03/msg03851.html

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- *From*: Tony Orlow <tony@xxxxxxxxxxxxx>
- *Date*: Sat, 17 Mar 2007 18:57:06 −0500

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cbrown@xxxxxxxxxxxxxxxxx wrote:

> On Mar 17, 8:59 am, Tony Orlow <tony@xxxxxxxxxxxxx> wrote:
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> > cbrown@xxxxxxxxxxxxxxxxx wrote:
> >
> > > On Mar 13, 9:22 am, Tony Orlow <t...@xxxxxxxxxxxxx> wrote:
> > >
> > > > cbr...@xxxxxxxxxxxxxxxxx wrote:
> > > >
> > > > > On Mar 12, 2:11 pm, Tony Orlow <t...@xxxxxxxxxxxxx> wrote:
> > > > >
> > > > > > mueck...@xxxxxxxxxxxxxxxxx wrote:
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> > > > > > > On 8 Mrz., 22:46, Tony Orlow <t...@xxxxxxxxxxxxx> wrote:
> > > > > > >
> > > > > > > > mueck...@xxxxxxxxxxxxxxxxx wrote:
> > > > > > > > WM, you don't disagree that there are infinite sets

containing just finite values, such as the reals in [0,1], are you? I certainly agree that an infinite set of naturals must contain infinite values, but that's only because they are spaced apart by a unit in value. Isn't tat your thinking?

If you disregad physical restrictions, then there are infinitely many real numbers in the interval. Their cardinality, however, is not larger than "infinite" for any set. Therefore we need no alephs etc. The binary tree shows that different alephs are self contradictive. If you take into account the physical restrictions, then there is no infinite set. And that is

the only correct approach.
Regards,
WM

Well, since numbers are not physical entities, they don't actually occupy space on the number line − they are true points. So, between any two finitely distant points are indeed some infinite number of points. You say that the only correct approach is to take into account "physical" restrictions, but where the subject is non−physical, those restrictions don't exist, though relations do, even if between infinite nonphysical concepts called numbers.

Wow! That actually made sense for an /entire/ /paragraph/.

:)
DM said, "Wow! That makes even less sense than WM's posts. Although, it doesn't quite reach the heights of Ross's nonsense."

I think he was referring to the content of the following paragraph.

Perhaps, but he didn't comment on the first. :(

Where we can count in sequence from one element to any other, that neighborhood is finite, even if unbounded. Where we can never count between some pair of objects, such as between, say, ...1111 and ....2222, they are actually infinitely distant elements of a sequence, since successor() exists.

Ermm... what th'!?!
Cheers − Chas

Was that a question?

One question might be "what is an example of a
neighborhood that is
finite yet unbounded?"

The atmosphere. :)

In what sense is the atmosphere finite? In what sense is it unbounded? If the atmosphere is finite, then there is a molecule of the atmosphere which is the farthest from Earth. A distance greater than that distance is a bound on the atmosphere, no?

If you add 0 forever, you will never get anywhere, right? If you append points to points, you can never make a line of any length, right? But, you have lines of finite length, and they have an uncountable number of points within them. No countable number of points can constitute a line segment of any length, but an uncountable number can, in theory.

Consider this an analogy to the addition of finite units. No countable number can achieve any infinite measure, where such a thing is properly established. Aleph_0 is, the way I see it, the equivalent of the smallest positive number, on the infinite scale. The smallest positive number does not exist, finite or infinite.

So, "countably infinite" means "finite but unbounded" to me.

So in your terminology, the distinction between something which is finite and something which is not finite is so vague that a mathematical object can simultaneously have the property of being finite and also /fail/ to have the property of being finite.

That argues for your perhaps developing a new term that corresponds to what is usually meant by "finite", so that the term actually /describes/ the property of being "finite" in the usual sense. Otherwise, I have no idea what you mean by "finite". In the usual sense, it is not possible for a mathematical object to be both finite and not finite.

In a countable set, there are only a finite
number
of elements between any two specific

elements.

Counterexample: The set of rationals in [0,1] is a countable
set, and
there are an infinite number of elements between any two
distinct
elements of that set.

Not in the order in which they are countable.

Is 1/2 between 1/4 and 3/4 "in the order in which they are countable"?

Starting at 1/1 and traversing the standard table diagonally to make a sequence, no, 1/2 is reached before 1/4, which is reached before 3/4:

1/1 1/2 1/3 1/4 ...

2/1 2/2 2/3 2/4 ...

3/1 3/2 3/3 3/4 ...

4/1 4/2 4/3 4/4 ...

5/1 5/2 5/3 5/4 ...

You cannot state two rational numbers included in Cantor's diagonal proof of their countability which are infinitely distant from each other in that sequence.

Why don't you give me two
rational numbers, which are not finitely distant in the
pseudo−sequential non−quantitative (read, bogus) ordering of the
rationals through sparse diagonalization? Which comes infinitely beyond
any other, in that "countable" sequence? Hmmm....

So you yourself claim that your statement only makes sense if we use a
"bogus" ordering of the rationals? Hmmm indeed!

That's the ordering used by Cantor to prove their countability. What I said was that no two elements in any countable set are infinitely distant from each other in any linear ordering that makes them countable. If this sequential order is valid for the rationals, then this fact applies. If you have a problem with the fact that there are an infinite number of rationals between any two in their natural quantitative order, then you should consider the possibility that non−quantitative orderings of subsets of the reals are not suitable for relative measure of those subsets.

> > > > There are an infinite
> > > > number of adic numbers between ...111 and
> > > > ...222, no? And the adics each
> > > > have a distinct successor, yes? What was the
> > > > question?
> > >
> > > Another question might be "are you aware of the difference
> > > between the
> > > definitions of a list of elements from a set, a total order on
> > > the
> > > elements of that set, and a well−ordering of the elements of
> > > that
> > > set?"
> > > Cheers − Chas
> >
> > Make it relevant to the topic, and we'll discuss that.

> You said:
>
> "Where we can never count between some pair of objects, such as
> between, say, ...1111 and ...2222, they are actually infinitely
> distant elements of a sequence, since successor() exists."
>
> By "since successor() exists", you seem to imply that:
>
> "/Because/ successor() exists, they are actually infinitely distant
> elements of a sequence".

Since successor(x) is defined for every such string, it constitutes a sequence. Since there exist elements more than any finite number of successions from each other, it is uncountable.

> But the existence of a successor function does /not/ imply a set is
> (or can be made into) a sequence or list, in the usual definition. It
> doesn't even imply a set is infinite, in the usual definition. Nor
> does it necessarily impose a total order; it may be at best a partial
> order.

If xeS −> s(x)eS, and ExeS AyeS s(y)<>x, then you have a countably infinite sequence at the very least. The question is whether one can have an uncountable sequence, which the adics clearly are.

> Let T be the set of all triangles in the plane. If t is a triangle, define successor(t) to be t after being rotated around the origin by pi/sqrt(2) radians. Every t has a unique successor. Every triangle t has a unique triangle for which t is its successor.

Indeed, and it constitutes an uncountably long sequence which is actually circular.

> Despite the existence of successor(), T is not a sequence; nor can it be made into a sequence, because T is uncountable

Uncountable sequences aren't a problem for me. The only thing that distinguishes this from a sequence for me is the fact that every point is a successor as well as having one. But, like the integers, where this may also be considered true, it's not surprising that an overall circular nature may manifest itself.

> Also, we can certainly define "t1 < t2" as "there is a natural number n such that t2 is the result of applying the successor function n times to t1". But there are triangles t and u such that it is not the case that t < u or u < t or t = u.

Right. Some will be uncountably many successions beyond any other. You can define '<' in this way, or you can define "t1 < t2" as "t2−t1>0". If t2 is infinitely past t1, then t1<t2. Like I said, the problem in this case is the circularity of the uncountable system.

> These observations arise from the definitions of "sequence" and "total order"; which is why I asked: ""are you aware of the difference between the definitions of a list of elements from a set, a total order on the elements of that set, and a well−ordering of the elements of that set?"
>
> Cheers − Chas

So, what do you call what I am calling an uncountable sequence? A nonexistent concept?
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