Re: Cantor Confusion

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- *From*: David Marcus <DavidMarcus@xxxxxxxxxxxxxx>
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Tony Orlow wrote:

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>> It is just supposed to work. No one is saying zero really is the empty set (whatever "really is" means).
>
> Then no one is saying the von Neumann successor ordinals "really are" the naturals? Good.

Correct. No one is saying that. It is simply a model that has the same mathematical properties, i.e., it satisfies the Peano axioms.

> Not when the alternative is a construction that establishes the equivalent of a new primitive through a dubious connection between succession and containment. What is more "parsimonious" in inventing some weird model of the naturals and declaring that it exists, rather than having succ() be a primitive relation? I don't see the advantage.

Basically, the smaller the language and the fewer the axioms, the better. If you are doing logic, you may not need your succ function, so it will just clutter up your proofs. If you are doing arithmetic, you need it, but then you can define it.

> If the sequence consists of segments of the form (0,x) or (x,0), there is no segment which is diagonal in direction. If every segment in the sequence is of the form (x,x), there is no segment which is not. This information is not evident when the pairs describing the curve are locations, because locations don't have direction.

OK, but the lines connecting successive points do have direction.

> So, my question remains. If this is a valid formulation of the two objects, and an explanation for Chas' counterexample to infinite−case induction, where does this fit with set theory?

Has nothing to do with set theory. If your "infinite−case induction" doesn't do what you want, then you need to construct something that does.

> I don't think the von
> Neumann ordinals as a model of a sequence can suffice, since they only allow finite values until a leap is made to the limit ordinals, and continuity is violated. This is the problem I have with the vNO's, and a large part of my problem with transfinitology. The notion that a sequence must be "countable" simply is not correct in the bigger picture.

If the usual notion of a sequence doesn't do what you want, then come up with one that does.

> > Then come up with an approach that does what you want. By "approach", I mean definitions (of objects, convergence, etc.) that let you prove the theorems you want. That's what everyone does. For example, Einstein came up with Brownian motion, but it wasn't clear how to mathematically model it. Wiener figured out how.

> Well, I'm suggesting a definition of the curve as a sequence of pairs which denote xy offsets, rather than a set of pairs of xy coordinates. Is that not a concrete enough description of an "approach" to spark a new neuron in your head? It should be. If you think there is something wrong with it, please elucidate.

Fine. State your definition of a curve, state a theorem, and state the proof of your theorem. If you do that, then you will be doing mathematics. That's what Wiener did: he came up with a model, then proved it had the properties that were needed for Einstein's Brownian motion.

> > > > I'm sure that cleared things up for you, eh?
> > >
> > > Pretty much.
> >
> > Did it? I rather thought you'd accuse me of being totally nonsensical,
> > though I know I'm not. Nice surprise (unless you're being as sarcastic
> > as I was).

Nope. Wasn't being sarcastic.

> PS − No good counterexamples to infinite−case induction? Too bad. :(

I didn't look. Is "infinite−case induction" a theorem?

−−
David Marcus
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