

Re: Well Ordering the Reals

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- *From:* "MoeBlee" <jazzmobe@xxxxxxxxxxx>
 - *Date:* 15 Nov 2005 14:28:33 -0800
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Tony Orlow wrote:

> MoeBlee said:

>> Tony Orlow wrote:

- > You yourself have spewed some rather
- > condescending junk at me, so I don't think you're in a position to complain.

I don't complain about the mere fact that you are often enough condescending and insulting, but rather I note the absurdity that you are so while being completely ignorant of the subject and while you're corresponding with people who are spending their own time, whatever their motives, explaining your errors to you.

- > So I guess that's a "no". You say "whatever you mean by that", and then go on
- > to conclude from your lack of understanding to surmise lack of understanding on
- > my part.

No, I conclude your lack of understanding from: (1) Your misuse of terms and the false inferences you draw, (2) Your ludicrously false statements about set theory, (3) The fact that you haven't studied the subject. Meanwhile, I note that your own terms are undefined.

- > If you have a question, try to be specific, not obnoxious.

When people ask specific and not obnoxiously, you usually answer with more undefined terms or to retrench yourself with your incorrect claims.

- > I am not an
- > axiomatic thinker for the most part, but I know how to put things into
- > axiomatic statements and how to analyze their underlying rationale.

You haven't addressed a single axiom of set theory, let alone analyzing their rationale. Meanwhile, and lately, you claim to give suggestions for axioms. But these are for nought without definitions.

- > It's about gross misconceptions in the standard theory regarding
- > infinity

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You don't even know what a theory IS let alone what it would mean to have misconceptions in one. You don't even have a clue as to the relation between theories and their meanings

..

> So, if I publish a book, does that make the ideas more valid? I suppose in the eyes of academia, sure.

None of this has anything to do with publication nor academia.

> Actually, I have addressed certain axiomas, spoken and unspoken.

You can't even open your mouth about this subject without immediately revealing your ignorance. There ARE NO unspoken axioms.

> I

> have offered axiomatics regarding finiteness and infinitude of numbers, which I see as more fundamental than the bijection-based definition of sets

What axioms? What are your primitive terms and your logistic system?

>> I did not read that debate. If you like, tell me what post claims that the set of strings of length L of members of alphabet S is not S^L .

> Ask Virgil what his objection is. He simply says it's in my imagination. Others agreed that it was true – for the finite case but not the infinite,

I'd be interested in seeing a specific post in which it is denied, given the axioms and definitions of set theory, that the cardinality of the set of strings of length L on an alphabet of cardinality S is not S^L , no matter what the cardinality of S and the cardinality of L .

>> For a finite alphabet, for a GIVEN finite length, the set of strings of that length is finite. But for a finite alphabet, the set of strings of ALL finite lengths is infinite.

> I entirely disagree.

Which of these three is your claim:

(1) In set theory, "The set of strings of all finite lengths is infinite" is a theorem.

(2) In set theory, "It is not the case that the set of strings of all finite lengths is infinite" is a theorem.

(3) In your own system – without a logistic system, primitives, axioms, and definitions – it is not the case that the set of strings of all finite lengths is infinite.

If (1), you've given no proof.

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If (2), you've given no proof.

If (3), then there is not even a context for proof.

> For any finite length string in any language, we have a
> finite set of predecessors. No finite string is in an infinite position in the
> set, so according to my understanding, where infinitude is defined first for
> quantities, there is no infinite set. Given a digital system, leading zeros to
> the left and trailing zeros to the right of the digital point are
> insignificant, so if we have L bits and base S , we have S^L unique values in
> the set, which already includes all shorter strings, since their values are
> included in the longer strings. When you have a language in general, you can
> consider a shorter substring to be different than the superstring, like "all"
> is a different word from "tall" and "stall". In this case, for any finite length
> of string L we have $\sum_{n=0}^L S^n$, or $S^{L+1}-1$, which is finite. There is
> not possible way that you can have an infinite number of finite strings, given
> a finite alphabet. The conclusion that you can is derived from the equally
> incorrect notion that you have an infinite number of finite naturals. There are
> a number of us that agree on this simple point, even if we disagree as to how
> to resolve it.

All of that, full of undefined terms, seems to boil down to your claim that the set of natural numbers is finite. Again, apply, mutatis mutandis, (1), (2), (3) from earlier in this post.

> That theorem is derived from the infinitude of finite naturals, but that is due
> to a definition of infinitude which conflates unboundedness of a set with
> infinite size.

Again, you open your mouth, and immediately you reveal your ignorance. There is no mention whatsoever of any word that is even close in meaning to 'unboundedness' in the set theoretic definition of 'infinite'.

>> People don't claim you're wrong merely for your being in disagreement
>> with them.
> For the most part, they do, actually.

No, they don't. They not only claim, but they prove you are wrong.

>>>> Forget about diagonals. Strings are functions. A countably infinite
>>>> string is a function from the set of natural numbers (ω) into a set
>>>> S (call this function ' ω pre S '). And there is bijection h between
>>>> the real interval $[0, 1]$ and ω pre $\{0, 1\}$ as follows: Each member f
>>>> of ω pre S corresponds, by h , to the real number that is the limit
>>>> of the infinite series (the limit is the sum) of rational numbers with
>>>> the numerator of the k th rational being $f(k)$ and the denominator of the
>>>> k th rational being 2^k . Now, let g be a 1-1 function from ω into
>>>> ω pre $\{0, 1\}$. Let j be a member of ω pre $\{0, 1\}$ as follows: $j(k)$
>>>> = 0 if $g(k) = 1$, and $j(k) = 1$ if $g(k) = 0$. If j were a member of
>>>> the range of g , then for some k , j would be $g(k)$. But if $g(k) = 0$,

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>>>> then $j(k) = 0$, and if $g(k)(k) = 1$, then $j(k) = 0$. So, for all k , $j \neq$
>>>> $g(k)$. So j is not in the range of g . So g is not onto $\omega \text{ pre } \{0, 1\}$.
>>>> So g is not a bijection between ω and $\omega \text{ pre } \{0, 1\}$. Since g is
>>>> an arbitrary function from ω into $\omega \text{ pre } \{0, 1\}$, there does not
>>>> exist a bijection between ω and $\omega \text{ pre } \{0, 1\}$ and thus there does
>>>> not exist a bijection between ω and the interval $[0, 1]$, and thus, a
>>>> fortiori, there does not exist a bijection between ω and the set of
>>>> reals, which, is to say, by the definition of 'uncountability', the set
>>>> of reals is uncountable. There are no pictures nor illustrations to
>>>> refute this. It's a done deal. It's a theorem.

>>

>>> The picture is still useful, and does exactly illustrate what is going on. You
>>> get n out of 2^n possible strings. The antidiagonal lies on a line beneath the
>>> diagonal.

>>

>> The antidiagonal does not lie on any line beneath any diagonal. There
>> is no diagonal, no antidiagonal, and no lines. These are only
>> metaphors. Using the metaphor, as you do, to INFER from the metaphor is
>> the mistake you're making.

> That's just an excuse. It's the DIAGONAL argument.

Please STOP for just ONE moment. YOU ARE NOT LISTENING. The proof is called a 'diagonal proof' because that is how, INFORMALLY, it is easily visualized and explained. The proof itself is a sequence of formulas that a computer can check, without reference or even a hint of the notion of diagonality. Arguments about squares, diagonals, squares, and rectangles are COMPLETELY IRRELEVANT to the correctness of the proof.

A proof is a sequence of formulas. The the writeup of the proof I gave you suggests what the sequence of formulas would be. There is nothing in that writeup that mentions ANYTHING WHATSOEVER about a diagonal. The proof is correct.

> However, as you demonstrate here, the real meaning of the
> construction is not well considered, and the result is deemed to prove the
> reals "uncountable", when in fact it doesn't deal with real numbers, but with
> digital number systems, whether they be the reals in $[0,1)$ or the naturals in
> \mathbb{N} .

Oy vey. The point is that we don't need to assert any "meaning" of the construction other than that it proves there is no bijection between the naturals and the reals. And that is all that is meant by 'the reals are uncountable' (since they are infinite). And this is not about "digital number systems". It's about the naturals and the reals, given any standard mathematical definition of 'natural number' and 'real number'. And if you don't like those definitions, then fine, it's about WHATEVER you want to call these sets in set theory. The sets in set theory that we call 'the natural numbers' and 'the real numbers', NO MATTER WHAT WE CALL THEM, have no bijection between them.

MoeBlee

• **References:**

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 - ◆ **Re: Well Ordering the Reals**
◇ From: Tony Orlow
 - ◆ **Re: Well Ordering the Reals**
◇ From: Randy Poe
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