Re: Well Ordering the Reals

Source: http://sci.tech−archive.net/Archive/sci.math/2005−11/msg01567.html

- *From*: "MoeBlee" <jazzmobe@xxxxxxxxxxx>
- *Date*: 10 Nov 2005 13:27:58 −0800

Tony Orlow wrote:
> MoeBlee said:
> > Tony Orlow wrote:
> >
> > > Actually, most of the standard axioms would get scrapped
> >
> > Then please say exactly what you would scrap in this list:
> >
> > classical first order logic
> >
> > identity theory
> >
> > extensionality
> > separation schema
> > power set
> > union
> > pairing
> > infinity
> >
> > regularity
> > choice
> >
> > replacement schema
> I am not sure about that. I see a system where the real line and quantity form
> one kind of set and infinity, and discrete counting systems form another, as in
> standard set theory, but where N=S^L as a rule for symbolic systems is
> observed, and the inverse function rule is applied for quantitative sets. The
> power set relation is important, but given undue attention and importance.
> Anyway, I think what I envision is simply a different starting point.

I don't know what you think the real line is (and whether by 'line' you
truly mean a geometric object or whether the set of real numbers and
the usual ordering on them are also non−geometric), nor do I know your
definitions of 'quantity', 'set', 'infinity', 'discrete', 'counting
system', 'N=S^L', 'rule for symbolic systems', 'inverse function rule',
'quantitative sets', and 'power set relation'. You have not specified a
logistic system, primitive terms, nor definitions, so of course people
are not going to welcome your vague ruminations as credible
mathematics.

Also, you say that the power set relation (whatever you mean by that) gets too much attention and importance placed on it. I find that an odd comment and one that seems, yet again, to reflect your lack of understanding of formal axiomatics.

> > As I understand, you claim that set theory (presumably Z set theory) is
> > inconsistent. So what is your derivation of a formula and its negation
> > in classical first order logic with identity theory, extensionality,
> > separation schema, power set, union, pairing, and infinity?
> Actually, Ross is the one that always says that, so I'll defer that question to
> Ross. As far as I can tell, standard set theory has managed to achieve some
> kind of internal consistency, although its external consistency, or agreement
> with other methods, is severely lacking, which leads to its inapplicability to
> anything but itself.

Again, no definition is provided by you of 'external consistency'. Also, as to inapplicability, as far as I know, set theory provides a theory in which to express virtually all of mathematics. That's all the application it needs to provide.

> > And what is your logistic system and axioms that you think provide a
> > consistent basis for mathematics?
> Well, I'll scrape together my notes and put up a web page for you to scoff at.
> I am not going to try to list what I consider axioms right here.

You won't be doing me a favor by coming to grips with axioms, but rather you'd be doing yourself a favor.

> > Your claimed proof of the well ordering of the reals cannot be
> > evaluated as coherent mathematics since your idiosyncratic mathematical
> > prose does not include specification or even a hint of a suggestion of
> > what logistic system your purported proof is a proof in, nor what
> > axioms it is a proof from, nor what your primitive terms are, nor what
> > your definitions are from those primitive terms.
> All probably true. I presented an interesting ordered set of reals, and started
> this thread by asking why it might not be a well ordering. I think maybe I got
> an answer, but it seems like the answe ris that one can never define any well
> ordering on an uncountably infinite set, despite the fact that choice somehow
> says it's always possible in theory. Did Godel show that only a random ordering
> could be a well ordering for the reals? If so, that says something.

It would have made more sense to find out what a well ordering IS, and THEN start a thread. As to specifing a well ordering, existence of well orderings, the axiom of choice, and Godel's proof of the relative consistency of the axiom of choice (the axiom of choice being equivalent to the well ordering theorem), the only way you'll ever understand these is to do what everyone else does − study the subject from page one. That would be the page that starts with "A set of symbols for a language..."

> > Also, among your many misunderstandings is your claim that the diagonal
> > proof of the uncountability of the reals is mistaken for assuming a
> > square rather than a rectangle. One poster already pointed out a sense
> > in which you are incorrect that there is a rectangle and not a square,
> > but it should be mentioned that you are incorrect in an even more
> > fundamental sense, which is that, in this context, talk of a square and
> > a diagonal through it is merely an informal means of suggesting a
> > visualization of a proof that formally does not concern geometric
> > shapes in any way whatsoever. The dialogue you've conducted in these
> > threads is tantamount to a demand that mathematics conform to your own
> > personal visualizations and abstractions rather than to verifiable
> > proof in rigorous logistic systems, and this intellectual egocentrism
> > of yours is part of why you keep missing the benefits of the vast
> > amount of months and months and thousands and thousands of posts worth
> > of free instruction you've so foolishly thumbed your nose at.
> Oh, I appreciate the participation of even the most hostile mathematicians
> here. Do I need to agree with everything standard? I don't think so. The
> conclusions of standard theory concerning infinities have always rubbed me the
> wrong way, and I am far from alone. So, bouncing ideas around helps me focus on
> exactly what the problems are and how to go about fixing them to the
> satisfaction of intuitions around the world. You must admit that, as imbecilic
> as you may think I am, plenty here have not only derived entertainment value
> from my antics, but have expressed that it is a good exercise in teaching
> technique. Interestingly, despite all the objections to my infinite naturals,
> infinitesimals, and functions on N (or aleph_0), some participants in these
> threads have found themselves using some of the ideas, before they realized
> what they were doing.

People are hostile to you here only because you've engendered that hostility with your stubborness and arrogance. And if you've appreciated the gratis attention you've received (which would benefit you, hostile or not, were you only to step back from your own self−righteousness for a minute or two a day) then you've sure got a funny way of showing it. And you don't need to accept the axioms of set theory. But you are irrational and foolish to argue about theorems and theories you don't even understand − don't even know what they ARE − and to deny logical consequences that are manifestly ineluctable.

And I don't think you are an imbecile. Rather, I suspect that you're pretty intelligent. Your problem is not smarts, but rather stubborness. You are not dumb, but you definitely have blocks to understanding certain things. You could remove those blocks if you would just slow down for a minute to actually TRY to understand what it is that people are telling you. But, speaking of Orlowian, you seem to think of yourself as some kind of Winston Smith of mathematical truth as you bravely refuse to concede to the Big Brother of the mathematical establshment that three is not two. That's posturing that is real immaturity. Hey, if you don't like set theory, then fine, don't use it. But then at least have the intellectual integrity to recognize that set theory, which does explicate mathematics, is not made inconsistent just for being at odds with your own uneducated intuitions and that, meanwhile, your own mathematics is without a basis for public evaluation for its lack of axioms and definitions.

As to the attention professional mathematicians have given you here being excercises in teaching, I think they're more like exercises in pedagogical pathology. You're like the one person who if it could be discovered how to enlighten you, then it would be known how to enlighten ANYBODY. But again, it needn't be that way.

> As far as the grid being only an illustration, oftentimes a picture says in an
> instant what takes a thousand words to explain. For binary strings of a given
> length L, one can form 2^L of them (as per N=S^L), which is always more than L.
> So, it is quite obvious that, if one were to have a complete list of all
> strings of length L, every such string would be in the list, but the
> antidiagonal would lie below the diagonal in the list, which would only
> traverse the first L of 2^L strings. So, I don't think I have a
> misunderstanding of what's going on in Cantor's daigonal argument. Anyway,
> thanks for the kind words.

Pictures nor explanations are proofs. You need to get past the picture phase and move on to logic.

Forget about diagonals. Strings are functions. A countably infinite string is a function from the set of natural numbers (omega) into a set S (call this function 'omega pre S'). And there is bijection h between the real interval [0 1] and omega pre {0 1} as follows: Each member f of omega 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 kth rational being f(k) and the denominator of the kth rational being 2^k. Now, let g be a 1−1 function from omega into omega pre {0 1}. Let j be a member of omega pre {0 1} as follows: j(k) = 0 if g(k)(k) = 1, and j(k) = 1 if g(k)(k) = 0. If j were a member of the range of g, then for some k, g would be g(k). But if g(k)(k) = 0, then j(k) = 0, and if g(k)(k) = 1, then j(k) = 0. So, for all k, j not= g(k). So j is not in the range of g. So g is not onto omega pre {0 1}. So g is not a bijection between omega and omega pre {0 1}. Since g is an arbitrary function from omega into omega pre {0 1}, there does not exist a bijection between omega and omega pre {0 1} and thus there does not exist a bijection between omega and the interval [0 1], and thus, a fortiori, there does not exist a bijection between omega 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.

Now, if you prove (with mathematical arguments using only the language and axioms of set theory, not with that pictures or illustrations) that there is a bijection between omega and omega pre {0 1}, then you will have proven the inconsistency of set theory. But, as you've noticed, no one is holding their breath for you to perform this feat. Personally, I place the odds that you you could be the Moses of the anti−uncountability of reals, delivering a proof of the inconsitency of

set theory on stone tablets, at about a gatrillionkajillionplex to 1.
As to kind words, here are my kind words for you: Shut up! Read a textbook on mathematical logic and on set theory and really learn the material. Find out about the relations among classical theories, constructivist and intuitionistic theories, and finitistic mathematics. Then come back with whatever questions, reservations, even disagreements you may have, and propose whatever actual mathematical system you can devise. But in the meantime, over a period of months and thousands of posts, you've just been making a fool of yourself, acting out in a sad waste of intellect, as, in a veritably obscene self−indulgence of your own willful ignorance and arrogance, you've abused the help of several professional mathematicians, whatever their motivations may be for wearing out the springs on their keyboards and spending their hard earned time on you.

MoeBlee

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- ***References***:
  - ***Re: Well Ordering the Reals***
    - *From:* Robert Low
  - ***Re: Well Ordering the Reals***
    - *From:* Tony Orlow
  - ***Re: Well Ordering the Reals***
    - *From:* Randy Poe
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