Re: Well Ordering the Reals

Source: http://sci.tech−archive.net/Archive/sci.math/2005−11/msg01564.html

- *From*: Virgil <ITSnetNOTcom#virgil@xxxxxxxxxxx>
- *Date*: Thu, 10 Nov 2005 14:18:38 −0700

In article <MPG.1ddd3f847222e08798a6b9@xxxxxxxxxxxxxxxxxxxxxxxxx>,
Tony Orlow <aeo6@xxxxxxxxxxx> wrote:

> David R Tribble said:
> > Tony Orlow wrote:
> > > You know, I am starting to get confused when asked about bit
> > > string length, because we are talking about two subjects at once.
> > > This thread was meant to be about the well ordering, whcih
> > > requires countably many bit strings. The bijection between *N and
> > > P(*N) should be considered to have uncountably many bit strings,
> > > where there is no end to the strings. So, yes Randy, as you
> > > suggested in the bijection we have uncountably long strings of
> > > bits. Apologies.

In order to have a "string of digits" in any reasonable sense, one must
have an index set I with a serial order on I so that each member of I,
with one possible exception (a last element), has an immediate
predecessor and each object, with one possible exception (a first
element), has an immedeate successor and a digit set D and finally a
function f:I −> D, representing that string.

What are the members of TO's *N? Are they representable as strings? And
if so, what is the index set?
> >
> > David R Tribble said:
> > >> Assuming that Tony's *N contains the finite and the infinite
> > >> naturals (whatever they are), P(*N) will contain all possible
> > >> subsets of those naturals. Tony's mapping maps naturals from *N
> > >> to subsets in P(*N) using binary bitstrings for each natural,
> > >> where each 1 bit corresponds to a natural as a member of the
> > >> subset.
> > >
> >
> > Tony Orlow wrote:
> > > Let's say they are uncountably long, without end, truly infinite.

Strings cannot be uncountably long if their index sets are to be
sequencially ordered. And that is a necessity for strings.

(A sequencial order is an order in which there are at most finitely many elements between any two given elements)
> >
> > You are confusing "uncountable" with "infinite", and "countable"
> > with "finite". Please learn to use the correct terms.

> I am saying the set of bits in each string is uncountably infinite,
> indexed by *N.

Not possible with strings! Whatever TO is using, they are not strings in any sandard meaning of the word.

And, unless TO's index set is sequentially ordered, his psuedostrings are not simply ordered.
> >
> >
> > David R Tribble said:
> > >> But such a mapping will fail to map to any subsets containing
> > >> infinite naturals, because all of the naturals in *N, finite and
> > >> infinite, are used up to map to all the all subsets of *N
> > >> containing only finite naturals. Tony doesn't understand this,
> > >> of course.
> > >
> >
> > Tony Orlow wrote:
> > > That's because in reality it's wrong. You use up all the finites
> > > to map the finite subsets of finite naturals. In reality, the
> > > power set is indeed bigger, but in bijection−land, the
> > > construction allows for the power set and the set to correspond
> > > without any identifiable end.

Since only TO, and equally self−deluded nuts, have access to "bijection−land", it is not something that impinges on mathematical reality.
> >
> > No, it does not. If a mapping is not complete, then it is not a
> > bijection.

> Which infinite string does not map to a ubset of *N and also a member
> of *N?

What is the index set for TO's "infinite strings" for *N?
What is the index set for TO's "infinite strings" for P(*N)?
Unless they are the same, or at least bijectable with each other, (which I think they cannot be) there is no bijection possible. See below!

If I understand TO's *N construction, which I do not actually claim to do, then the index set for *N is N, i.e., each member of *N is equivalent to a mapping f:N −> {0,1}, but each member of P(*N) is has index set *N, i.e., is equivalent to a mapping g:*N −> {0,1}.

Thus any alleged bijection between *N and P(*N) will require a bijection between N and *N.

Can TO come up with a bijection between N and *N? I think not!

Note: Theorem:
In the category of sets and functions: For arbitrary sets A, B and C

Let Hom(A, C) be the set of all functions from A to C, and Hom(A,C) be the set of all functions from A to C.
Then any bijection, Phi, from Hom(A,C) to Hom(B,C) induces a bijection, Psi, from B to A by (Phi(f))(b) = f(Psi(b)).

Note: f is in Hom(A,C),
Phi(f) is in Hom(B,C) and
b is in B, so (Phi(f))(b) is in C.
Psi(b) is in A, so f(Psi(b)) is in C.

TO might benefit from a little diagram chasing!
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- ***References***:
  - ***Re: Well Ordering the Reals***
    - *From:* Robert Low
  - ***Re: Well Ordering the Reals***
    - *From:* David Kastrup
  - ***Re: Well Ordering the Reals***
    - *From:* Tony Orlow
  - ***Re: Well Ordering the Reals***
    - *From:* Daryl McCullough
  - ***Re: Well Ordering the Reals***
    - *From:* Randy Poe
  - ***Re: Well Ordering the Reals***
    - *From:* David R Tribble
  - ***Re: Well Ordering the Reals***
    - *From:* Tony Orlow

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