Re: New countable infiniity logic

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In <b453b903.0411201121.6f4ad3ac@posting.google.com>, on 11/20/2004
at 11:21 AM, whit0911@umn.edu said:

>I am also saying that the set Dec3 = { 0.3, 0.33, ... } is an
*>infinite set and therefore *must* have an infinite number of digits*
>since it is formed from an infinite sequence (albeit of finite
>sequences of digits). For the set not to be finite, there must be an
>infinite number of digits, and therefore 0.333... must be present in
>set Dec3 or else Dec3 is an not infinite set.

No, that's a non sequitor; there is no "therefor".

>Are you saying Dec3 ={ 0.3, 0.33, ... } =/= { 0.3, 0.33, ...,
>0.333...} since this new set has one more element? If yes, call
>this set Dec3&1/3

No, *YOU* said it, by defining D3 in such a fashion as to exclude 1/3.

>So are you saying that the set Dec3&1/3 = { 0.3, 0.33, 0.333, ...,
>1/3 } cannot also be specified by rearranging elements to give
>Dec3&1/3 =
>{ 1/3, 0.3, 0.33, 0.333, ... }.

No, he's distinguishing the set {1/3, 0.3, 0.33, 0.333, ...} from the sequence (1/3, 0.3, 0.33, 0.333, ...) and from the net (0.3, 0.33, 0.333, ..., 1/3).

>Why is this set of order type omega +1?

Order type only applies to ordered sets. (0.3, 0.33, 0.333, ..., 1/3) is of order type omega+1 because (0.3, 0.33, 0.333, ...) is of order type omega.

>If the sequence (0.3, 0.33, ...) is an infinite sequence, how are
>there not an infinite number of digits?

Again, you are confusing the number of digits in the sequence with the number of digits in an individual element.

>0.333... must be part of this sequence or else it is not an infinite
>sequence.

No.

>It is one dimensional,

Irrelevant.

>and must either be an infinite sequence and contain 0.333..., or be
>a finite sequence.

No; it is an infinite sequence that *BY YOUR DEFINITION* does not contain 0.333...

>I would argue that the reason one should add the extra last element

If you add another element then it is not the same sequence. You can't add it at the end if you want the new object to be a sequence; the best that you can do is to construct an ordered set or a net with it at the end.

>I would argue that the reason one should add the extra last element
>is to completely identify the sequence and eliminate all other
>possible sequences such as (0.3, 0.33, 0.333, ..., 0.333335,
>0.3333353, ...).

You eliminated them by defining D3 the way you did. Your definition completely identified D3; you can't add or remove an element without changing the definition.

>This becomes particularly true when trying to specify irrationals,
>such as (Pi/100), ((sqrt 2)/2), or (4e/9Pi) most of which decimal
>sequences would otherwise be unrecognizable.

What does that have to do with anything? Either the sequence converges or it doesn't.

>Cannot the same objection be given for the decimals?

No, because there is no claim that there is an infinite sequence of digits followed by another digit.

>I believe that the list of naturals are infinite and that each
>accepted individual natural is finite.

What do you mean by "accepted"? Are you using a private definition of natural number and, if so, what is it?

>I also believe that the number of digits

A list of naturals is not a list of digits used to express those naturals.

>the list of infinite naturals

There are no infinite naturals.

>generates

A list doesn't generate anything, it merely enumerates.

>This seemingly contradictory belief arises from

The fact that you are confusing a list of naturals with the list of digits used to express them in decimal notation.

>I am concerned that set theory has a contradiction that may require
>naturals that are infinite.

There will be time to discuss that when someone produces such a contradiction.

>that may require naturals that are infinite.

How would that cure any hypothetical contradiction is Set Theory?

>Does not the infinite set dec2 = { 0.2, 0.22, 0.222, ... } contain
>or string together an infinite sequence of the (finite−sequenece)
>elements that cause it to get an infinite sequence of digits?

No. Dec2 does not list the digits.

>This confuses me and sounds contradictory with my meager
>understanding of the concept of an infinte set.

What wider understanding? You seem to have trouble distinguishing an element of a list or set from an element of an element. That distinction is crucial to understanding Set Theory, even for finite sets. Example: How many elements are there in {0.123, 0.456}? You will note that while there are six distinct digits to the right of the decimal points in the elements of that list, there are only two elements of the list.

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