

Re: On Well-Ordering(s) and Sets Dense in the Reals, Infinity

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Ross A. Finlayson wrote:

- > *if you have a sequence with infinitely many ones and zero you can*
- > *generate most irrationals, and half of the possible sequences.*

Actually, you can get all real numbers if you're have a wide enough deefinition of "reorder".

For example, define a "reordering" to be an injective map $f: \mathbb{N} \rightarrow \mathbb{N}$ where $f(n)$ is the position in the old sequence from which you get the n 'th element in the new. For any finite set of labels, such a "reordering" is bijective. For infinite sets of labels, it need not be.

- > *That consideration of sampling real numbers is digression from the*
- > *point about measure theory and probability: that the utility is*
- > *primarily about the cardinality of the continuum and continua, and thus*
- > *the basically geometric nature of the continuum instead of its*
- > *cardinality, and that it could be explained that way.*

Not at all. Many of the functions I talk about aren't even defined over the reals, let alone dependent upon their geometric structure.

- > *So, aside from that digression, if I want to support measure*
- > *theoretical results or provide alternate mechanisms for correct results*
- > *using my little theory where infinite sets are equivalent, then it*
- > *would lead to some retrofitted underpinnings of measure theory as*
- > *necessary*

Definitely. All of analysis to begin with.

- > *I wonder: is there any use in meature of transfinite cardinality*
- > *besides the cardinality of the continuum?*

Cardinality of the powerset of the continuum is certainly used; I don't personally recall encountering explicit use of cardinalities larger than that.

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- > *Second: does probability theory use transfinite cardinals besides*
- > *using measure theory?*

As I was taught it, probability theory **is** measure theory for a particular class of measures.

– Tim