

Re: infinity

Source: <http://sci.tech-archive.net/Archive/sci.math/2005-10/msg00426.html>

- *From:* "David R Tribble" <david@xxxxxxxxxxxx>
 - *Date:* 5 Oct 2005 14:17:29 -0700
-

Ross A. Finlayson wrote:
>> So: well-order the reals.
>

Jonathan Hoyle wrote:
> Sigh. Didn't I do this one already? Here it is again <grin>:
>
> Take any arbitrary 1-1 mapping F from the reals R to the power set of
> natural numbers P(N). By the Axiom of Choice, we know we can
> well-order P(N), so take any such well-ordering, \leq . Define a \leq
> operation (obviously different from the standard one) on R such that
> for a,b in R, $a \leq b$ whenever $F(a) \leq F(b)$. You have now well-ordered
> R. Creating F and well ordering P(N) are left as exercises. :-)

To well-order P(N), we can define a ' $<$ ' relation between members of P(N):

a. $\{\} < \{i, \dots\}$ for all i in N;
The empty set is less than any set with one or more members.

b. $\{i, \dots\} < \{j, \dots\}$ if $i < j$ for all i, j in N;
Any set with a least element i is less than any other set with a least element j if $i < j$.

c. $\{i, j, \dots\} < \{i, k, \dots\}$ if $\{j, \dots\} < \{k, \dots\}$
for all i, j, k in N and $i < j$ and $i < k$;
For two sets both having a least member i , the first set is less than the second if the set formed by removing i from the first set is less than the set formed by removing i from the second set (this is a recursive definition that makes use of the previous rules).

So all the the members of P(N) can be ordered using the ' $<$ ' relation defined above.

.

- *Follow-Ups:*

- ◆ **Re: infinity**
◇ From: Tony Orlow
- ◆ **Re: infinity**
◇ From: Jonathan Hoyle

• **References:**

- ◆ **Re: infinity**
◇ From: Jonathan Hoyle
- ◆ **Re: infinity**
◇ From: Ross A. Finlayson
- ◆ **Re: infinity**
◇ From: Jonathan Hoyle
- ◆ **Re: infinity**
◇ From: Jonathan Hoyle
- ◆ **Re: infinity**
◇ From: Ross A. Finlayson
- ◆ **Re: infinity**
◇ From: Jonathan Hoyle
- ◆ **Re: infinity**
◇ From: Ross A. Finlayson
- ◆ **Re: infinity**
◇ From: Jonathan Hoyle
- ◆ **Re: infinity**
◇ From: Ross A. Finlayson
- ◆ **Re: infinity**
◇ From: Jonathan Hoyle

- Prev by Date: **Re: Drawing Cayley graphs**
- Next by Date: **Re: motivating a kid into analysis**
- Previous by thread: **Re: infinity**
- Next by thread: **Re: infinity**
- Index(es):
 - ◆ **Date**
 - ◆ **Thread**