# Re: Cardinality of the surreals

***Source:*** http://sci.tech−archive.net/Archive/sci.math/2005−12/msg00033.html

- *From*: "Hero" <Hero.van.Jindelt@xxxxxx>
- *Date*: 30 Nov 2005 11:00:25 −0800

Peter Webb wrote:
> > How is the last part ("The class of surreal numbers is too big to be a
> > set") proven? Is it a simple proof, along the lines of: Every ordinal
> > is a surreal number, or is there something to the proof? And if the
> > proof isn't trivial, could you steer me towards a reference? (Wikipedia
> > doesn't provide one.)
> >
> > −−− Christopher Heckman
> >
>
> Trivial, I think ...
>
> Definition: If L and R are two sets of surreal numbers and no member of R is
> less than or equal to any member of L then { L | R } is a surreal number.
>
> Let S be the set of all surreal numbers.
>
> Let L = {x: x is an element of S and x<1}
> Let R = {x: x is an element of S and x>=1}
>
> Then {L|R} is a surreal number which is not part of S.
For me, it seems that surreal numbers are ordered pairs of numbers. As
they are defined as subsets of real numbers with respect to the usual
ordering, the set S of all these numbers is a subset of the powerset of
|R , which is { T | T is a subset of |R }.
For a picture: a surreal number { L | R } is just complemented by an
open Intervall ( L, R) to give |R, the whole number line. In other
words
{ L | R } union ( L, R) = |R and
{ L | R } cut with ( L, R) = { }.
I hope that this is true. If it is true, what's the consequence for
cardinality ?
Hero
PS By rewriting { L | R } as { (L + R) / 2 − (R − L ) / 2 | (L + R) /
2 + (R − L ) / 2 }
one can proceed to more geometrical dimensions by regarding the planes
with the inside of a circle cut out, or the whole space with open
spheres cut out, or proceed to more mathematical dimensions.

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- ***Follow−Ups***:
  - ♦ ***Re: Cardinality of the surreals***
    - ◊ *From:* Dik T. Winter
  - ♦ ***Re: Cardinality of the surreals***
    - ◊ *From:* Nathan

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