# Re: #326 Counting an infinite set versus a finite set ; new textbook: Mathematical Physics (Reals & Counting Numbers/AP−adics Primer) for age 6 years onward

***Source:*** http://sci.tech−archive.net/Archive/sci.math/2007−11/msg03658.html

- *From*: "Jesse F. Hughes" <jesse@xxxxxxxxxxxxx>
- *Date*: Mon, 19 Nov 2007 07:23:58 −0500

a_plutonium <a_plutonium@xxxxxxxxxxx> writes:

> > If I start counting at 0, I get to 1 at the same time as I get to
> > 10^0.
> > I get to 2 before I get to 10^1.
> > I get to 3 before I get to 10^2.
> > I get to 4 before I get to 10^3.
> >
> > and so on, but I get to 10^{999....998} before I get to 999....999.
> >
> > (The above you just conceded.)
>
> I conceded not because of your argument, although it hastened it, for
> I conceded because I have the illogic that 999....99999 +1 =
> 10000....00000
> which is (pi) the South Pole and yet that cannot be consistent with
> 10^9999.....99999 which is also the South Pole since it has one more
> digit place
> value than 9999.....999999 itself.
>
> So it is not your argument that force me to concede although it helped
> to hasten.

Whatever.

[...]

> > Thus, there is some n such that
> >
> > If I start counting at 0, I get to n before I get to 10^{n−1}, but
> > I get to 10^{n} before I get to n+1
> > (or maybe at the same time).
> >
> > Do you agree with the above? If so, then what follows is an obvious
> > consequence.
> >
> > As lwalke3 pointed out, this would mean:
> >
> > I get to n before 10^{n−1},
> > to 10^{n−1} before 10^n,
> > to 10^n before or at the same time as n + 1
> >
> > and thus, there is at least one number between n and n + 1.
>
> No, I buy none of that.

Okay, then you're just too broke to reason with.

You claim that every AP−adic aside from zero has a predecessor, yes?
And that, starting at zero and adding one repeatedly, we will
eventually reach any AP−adic?

Let P be the property "We count to n before we count to 10^{n−1}." We
know that P is true at n=1, 2, 3. We know it is false at n =
999...999.

Now, I claim there is some n such that P(n) is true, but P(n+1) is
false. You claim not. Let's suppose you're right. Then it follows
that, if P(n) is true, so is P(n+1).

Start counting at 1 and we get:

1: P(1) is true.
2: P(2) is true because P(1) is true.
3: P(3) is true because P(2) is true.
4: P(4) is true because P(3) is true.

and so on. Each time we reach a new number n, P(n) must be true,
since it was true at the predecessor. According to you, eventually,
we reach 999...9997 by counting and thus we see:

999...99997: P(999...99997) is true because P(999...99996) is true.
999...99998: P(999...99998) is true because P(999...99997) is true.
999...99999: P(999...99999) is true because P(999...99998) is true.

Oops!

Thus, what I said must be correct. There is a number n so that P(n) is true and P(n+1) is false.

I've wasted enough time on this obvious point to continue, I reckon.
−−
Jesse F. Hughes
"Certainly he who can digest a second or third fluxion need
not, methinks, be squeamish about any point in divinity."
George Berkeley, 1734
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