Re: Is zero even or odd?

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From: Michael Mendelsohn (*invalid_at_msgid.michael.mendelsohn.de*)
Date: 12/29/04

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John Fields schrieb:
> On Mon, 27 Dec 2004 20:58:44 +0100, Michael Mendelsohn
> <invalid@msgid.michael.mendelsohn.de> wrote:
>
> >Below, you remove the short from my diagram.
> >However, you also remove the power supply, which achieves the same
> >thing.
>
> −−−
> I don't know what you mean, since the + and − terminals are there and
> I refer to the voltage across the resistance as being 1V.

You eventually lower the voltage to 0V.
That's what I achieved with the short.

> >> The proper circuit:
> >>
> >> +−−−(V)−−−+
> >> | |
> >> (−)−−−o−−−[R]−−−o−−−(A)−−−o−−−(+)
> >>
> >> Will yield the proper results if examined using Ohm's law.
> >>
> >> Assuming that the voltage across the resistance is 1V and the current
> >> through it is 1A, then the resistance will be:
> >>
> >> E 1V
> >> R = −−− = −−−− = 1 ohm (1)
> >> I 1A
> >>
> >
> >Assuming that the voltage across the resistance is 2V and the current
> >through it is 1A, then the resistance will be: 2 ohm.
>
> −−−
> Why would I want to do that? I'm specifically setting up a set of
> conditions to illustrate _my_ point, not yours.

I am trying to illustrate that I can make a point that 0/0=2.
You cannot discard my point without adding extra information about your set of conditions.

This extra information is not present in the 0/0 term, but it _is_ explicitly written in lim x−>0 x/x and lim x−>0 2x/x , respectively.

> >> Now, if we go to the more general case of:
> >>
> >> x
> >> y = −−−
> >> x
> >>
> >> we can see that for any value of x, as x goes to zero, y will remain
> >> constant, and exactly equal to 1. Therefore,
> >>
> >>
> >> 0
> >> −−− = 1
> >> 0
> >
> >This is only true because you assumed a resistor of 1 ohm. If you assume
> >a resistor of 2 ohm, then 0/0 = 2.
>
> −−−
> Yes, of course. But I didn't "assume" a resistance of one ohm, I
> selected the voltage and current to force the resistance to one ohm.
> −−−
>
> >Again, you can only state with concidence that 0/0 = 1 in this case
*> >because you already *know* that the resistance is 1; you have not*
> >computed it from 0/0, because the 0/0 quotient doesn't help you to know
> >that the resistance is 1 ohm.
>
> −−−
> The game being to prove that 0/0 = 1, I'm not looking so much for a
> resistance of 1 ohm as I am a set of values which when divided by
> themselves will result in a quotient of 1.

You want 1 ohm, that's what you bring into the computation. You're setting everything up so that 1 ohm results, which means it's circular reasoning.

If you hadn't set everything up that way, the 0V/0A measurement would leave you stumped as to the value of the resistor, and 0/0=??? then.

Again, the set of values that are divided by itself is x/x for all x in R\{0}, and lim x−>0 x/x = 1 as well.

> Let's make them each equal to 1E−40:
>

> 1E−40
> x = −−−−−−− = 1
> 1E−40
>
> Damn! That x is still equal to 1!
>
> It seems that no matter what we do, as long as the numerator and
> denominator are equal, the quotient will always be 1. So, if the
> smallest number we can come up with is 0, and if 0 = 0, then it seems
> we can say:
>
> 0
> x = −−− = 1
> 0

You are doing the limit argument nicely.
Now you arrived at x=1 not by dividing by 0 outright, but by taking larger values and going closer to 0. I would explicitly write what you did, so your last formula would change to

$$x = \lim_{r \to 0} \frac{r}{r} = 1$$

This is mathematical shorthand for your reasoning that any nonzero value plugged into r/r is 1, so it makes sense to take r/r=1 for r=0 as well.

> >> The value of x is unimportant. What does matter is that the numerator
> >> and denominator be numerically equal.
> >
> >No, it matters that they are algebraically equal.
>
> −−−
> Yeah, good point. they have to have the same sign in order for the
> quotient to come out positive.

You misunderstood my point. My point is that you have to arrive at x/x or r/r before you plug in the zero. Conmsider: if you had x=2r/r, put in r=0 to get x=2*0/0 and use 2*0=0 to simplify to x=0/0, then the numerator is algebraically 0=2r and the denominator is algebraically 0=r, and then

$$x = \lim_{r \to 0} \frac{2r}{r} = 2$$

which would lead you to conclude that 0/0=2, in this case. You set your case up so that x=r/r, i.e. numerator and denominator are algebraically the same *before* you plug in the zero.

This is not true for R=E/I, which is why you can't make a measurement in the E=0, I=0 case (unless you have extra information).

> *>If I give you a resistor to measure, but no power supply, you will*
> *>measure 0A and 0V, but must the resistor always be 1 ohm, then?*
>
> – – –
> *Since R = E/I, I won't be able to make a measurement, so the cat will*
> *be both dead and alive.*

You seem to grasp that so well. You can certainly measure 0V and 0A, but you can't determine R. For what reason do not grasp the analogy that 0/0 represents the same condition in mathematics?

Cheers
Michael

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Still an attentive ear he lent        Her speech hath caused this pain
But could not fathom what she meant   Easier I count it to explain
She was not deep, nor eloquent.       The jargon of the howling main
                 -- from Lewis Carroll: The Three Usenet Trolls
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