

## Re: Is zero even or odd?

**Source:** <http://coding.derkeiler.com/Archive/Perl/comp.lang.perl.misc/2004-12/2588.html>

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**From:** Michael Mendelsohn (*invalid\_at\_msgid.michael.mendelsohn.de*)

**Date:** 12/29/04

Date: Wed, 29 Dec 2004 13:58:54 +0100

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 IV.*

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 IV and the current*  
> >> *through it is 1A, then the resistance will be:*  
> >>  
> >> *E IV*  
> >> *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.*

comp.lang.perl.misc: Re: Is zero even or odd?

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  $\lim_{x \rightarrow 0} x/x$  and  $\lim_{x \rightarrow 0} 2x/x$ , respectively.

> >> *Now, if we go to the more general case of:*  
> >>  
> >>  $x$   
> >>  $y = \text{---}$   
> >>  $x$   
> >>  
> >> *we can see that for any value of  $x$ , as  $x$  goes to zero,  $y$  will remain*  
> >> *constant, and exactly equal to 1. Therefore,*  
> >>  
> >>  
> >>  $0$   
> >>  $\text{---} = 1$   
> >>  $0$   
> >  
> > *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 coincidence 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  $\mathbb{R} \setminus \{0\}$ , and  $\lim_{x \rightarrow 0} x/x = 1$  as well.

> *Let's make them each equal to  $1E-40$ :*  
>

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> 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

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

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. Consider: 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

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

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).

