Re: total resistance in parallel circuits

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- *From*: "Tim Williams" <tmoranwms@xxxxxxxxxxx>

- *Date*: Wed, 5 Oct 2005 18:36:01 −0500

"Midnight Oil" <jamie@xxxxxxxxxxx> wrote in message
news:20051005155041.W32789@xxxxxxxxxxxxxxxxxxxx
> I ran into the formula for finding the total resistance in a parallel
> circuit, struggled with it's meaning...and I want to be sure I
> understand the formula:

> I broke the formula down like this:
>
> R(tot) = 1 <−−− E (volts)
> −−−−−−−−−−−−−−−
> 1 + 1 + 1
> −− −− −− <−−− I (amps)
> R1 R2 R3

Incorrect: the ones do not represent any units, so the only thing you'll get out is what you put in − in this case, ohms. The intermediate step of reciprocal resistance in ohms (which is conductance in mhos) follows from the nature of the circuit.

Aside from the confusion on units ...

> In other words, 1/Rx reveals the amount of current in one branch of
> the parallel circuit, and adding these together gives us the total
> current in the circuit when 1 volt is applied. If we divide 1 volt by
> that value, we get the resistance in the circuit when one volt is
> applied.

Correct.

What you are imagining is equivalent to the mathematical technique of testing a "well−behaved" function at a convienient value like x = 1 and extrapolating or proving other values based on this.

Given nice ohmic devices, the exact same behavior applies, as a matter of fact, so it is true you can test and prove it in this way.

> I thought it was interesting that 2 interpretations of the formula
> could co−exist...or was my own interpretation of the formula wrong?

Only as I mentioned above. Gotta watch units in equations. :)

> Is it just a coincidence that the amount of conductance is equal to the
> amount of current flowing when 1 volt is applied?

Nope, it's by definition in fact :)

Tim

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Deep Fryer: a very philosophical monk.
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- ***References***:
  - ♦ ***total resistance in parallel circuits***
    - ◊ *From:* Midnight Oil

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