

Re: Maxwell's Displacement Current

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> "jahn" <suzysewnshow@yahoo.com.au> wrote in message
> news:2u5d1pF26p6m2U1@uni-berlin.de...
> : "Androcles" <dummy@dummy.net> wrote in message
> : news:wSdfd.46034\$i02.788@fe1.news.blueyonder.co.uk...
> : >
> : > "jahn" <suzysewnshow@yahoo.com.au> wrote in message
> : > news:2u565dF261fgfU1@uni-berlin.de...
> : > :
> : [snip]
> : > : > : Sue...
> : > : > : Oh Yeah.. The topic... (I am easilsy distracted...BLUSH)
> : > : > : > : > :
> : <http://farside.ph.utexas.edu/teaching/em1/lectures/node41.html>
> : > : >
> : > : > Ugh... back to doing hard sums.
> : > : >
> : > : > (382) has solution in the form $A \sin(\omega t + \phi)$ and does not
> : > : > compel
> : > : > E and B fields to be in phase. Remember to add a constant
> : > : > when
> : > : > integrating.
> : > : >
> : > : > (383) oh, there it is j , a 90 degree phase shift.
> : > : > Looks like I agree with Maxwell after all, if you plot it
> : > : > in the
> : > : > complex
> : > : > plane with a time axis.
> : > : > I expect some people think the j refers to the two fields
> : > : > being
> : > : > orthogonal,
> : > : > but $\nabla \times E = -\dot{B}$ tells all. It's phase shift.
> : > : >
> : > : > Right—Oh! (382) is from Faraday's law or the "orthogonality
> : > : > relation"
> : > : > The $+$ or $-j$ in (383) is the advanced or retarded potential
> : > : > and is
> : > : > *imaginary*

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> : > : *power transfer so has no obligation to respect the speed of*
> : *light.*
> : >
> : > *Yep. And transformers don't respect it either.*
> : >
> : >
> : > : *In converting cgs and Coulomb gauge to SI something gets*
> : *terribly*
> : > : *misstated because of this oversight but my own math skills*
> : *leave*
> : > : *me dependant on other's papers to try an describe it.*
> : > : <http://www.reciprocalsystem.com/bpm/bpm15.htm>
> : > :
> : <http://scienceworld.wolfram.com/physics/MagneticVectorPotential.h>
> : *tml*
> : >
> : >
> : >
> : > :
> : > : *Anyway... It will cause any discussion of SR to run in circle*
> : *unless*
> : > *you*
> : > : *can not only show the errors but also the fix.*
> : >
> : > *LOL. Very punny.*
> : > <http://www.androc1es.pwp.blueyonder.co.uk/Radio%20Wave.htm>
> : > *In the diagram, the time axis is out of the screen. Energy is*
> : *the*
> : > *radius.*
> : *That's a good essay. You probably won't agree that is seems most*
> : *accurate for a CP wave moving in a dielectric, but that's the*
> : *way*
> : *I see it.*
>
> *Thank you, but I'll add:*
> *I don't deny light travels in glass, water, diamond, etc. There*
> *are dielectrics. I just refuse to call the vacuum of space a*
> *dielectric,*
> *I see need for it. Aether would be a dielectric and there is no*
> *aether.*

If the entire universe was one electron and one positron, would you call that a vacuum or a dielectric and just what is the magic number you use to decide when a vacuum has enough particles to be called a dielectric?

>
>
>
> : >
> : > :
> : > : > *Good research, Sue.*

> : > : *Thank you. :-)*
> : > : *Now if you one of you maths gurus will replace the "displaced
> : > : ether" and "retarded potential" with a [oops][377] 177 ohm
resistor I can*
> : > : *Google up our Nobel lecture instead of some harried
> : professor's*
> : > : *scribblings.*
> : > :
> : > : *Sue...*
> : >
> : > *You'll have to explain that resistor to me in words of one
> : syllable,*
> : > *cos I can't see what it refers to.*
> :
> : *Maxwell and Hertz weren't quite on the same page when Maxwell
> : was tweaking Ampere and Faraday's laws and inventing
> : "displacement current".*
>
> *Well, ok. To me, a voltage can exist, a capacitor can be charged
> and there is no current flowing. Pressure without movement.*
>
> :
> : *If you arrange perfect reflectors so a dipole can't radiate the
> : "displacement current" and radiation resistance would go to
> : zero or infinity because there is no energy lost to radiation
> : which is what the 377 ohms represents.*
>
> : *Maxwell didn't quite have the insight we do to see a quarter
> : wavelength stub coupling his dipole to infinity.*
> : *A short circuit at one end, looks like an open circuit at the
> : other.*
> : *An open circuit at one end, looks like a short circuit at the
> : other.*
> : *A resistor looks like itself if it matches the characteristic
> : impedance of the stub.*
>
> *I don't see a displacement current. I see a changing magnetic field.*

I doubt you have ever "seen" a magnetic field but I will admit you may have seen a spinning charge move as the result of the force between it and another spinning charge.

> *Referring to impedance, that is frequency dependent.*
No. Not in transmission line theory. I don't see any echo ringing or shadows on the television to my left on any channel so am reasonably sure
the 75 ohm load it presents is transferred evenly along the feed line from 50 to 700 Mhz. With 1mm dia line I'm confident it would do as well up to 10 or 20 GHz.
> *There is a difference between resistance and impedance.*
Sometimes.

- > *Resistance limits current in phase with the voltage. Impedance*
- > *limits current out of phase with the voltage, and for any given*
- > *C that current increases with frequency. For any given L it*
- > *decreases with frequency. For an LC circuit there is a balance*
- > *point where the current is maximized at some frequency.*

Ahhh ... hem... You can say that better. LOL

http://www.allaboutcircuits.com/vol_2/chpt_13/7.html

- > *This is the "characteristic impedance" frequency, for which*
- > *coax is designed. A 50 ohm or 70 ohm cable only has that*
- > *value at the optimum frequency, and yes, it can be terminated*
- > *with a suitable load for maximum power transfer, which is*
- > *maximum current in the resistor with maximum voltage*
- > *across it. When there is no resistor, there is no current.*

No. Maxwell may have thought that but to restate:

For odd multiples of $\lambda/4$...

A short circuit at one end, looks like an open circuit at the other.

An open circuit at one end, looks like a short circuit at the other.

A resistor looks like itself if it matches the characteristic impedance of the stub.

Since there is no reflection in free space, it is a perfectly terminated 377 ohm transmission line to infinity. Eh?

<< A closely related parameter is the impedance of a wave; this is the ratio of E/H and for free space is close to 377 ohms. This is not to be confused with the radiation resistance of an antenna; it's just that they have the same units. If a propagating radio wave encounters a medium of a different impedance, part of the wave is reflected, much like the reflections at a discontinuity in a transmission line. The remaining energy of the wave that passes through the discontinuity is refracted in a different direction of propagation, just like the distortion one sees as a light beam passes through water. The reflection and refraction properties often depend upon the polarization of the EM wave.

>> <http://www.borg.com/~warrend/guru.html>

Lotsa pics... most look about right.

Kind regards,

Sue...

>

> :

> : *A realistic interpretation of his equations would need to*

> : *dispense*

> : *with the false notion of ether being displaced to explain current*

> : *flow and instead show it's flow through a resistive virtual*

> : *cylinder*

> : *surrounding the dipole. The dipole shouldn't know if it is*

> : *heating a*

> : *carbon cylinder or a plasma cloud three galaxy's away but it*

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> : *should know if it is shielded by a conductive cylinder.*
> :
> : *Such interpretations may exist, but I am not sure I would*
> : *even recognize them if I saw them.*
> : -----
> : *Sue...*
> : >
> : >
> : > : > *Androcles*
> : *[snip]*