MAXWELL's EQUATIONS OF THE ELECTROMAGNETIC FIELD!!

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MAXWELL's EQUATIONS OF THE ELECTROMAGNETIC FIELD

The nucleus of James Clerk Maxwell's electromagnetic theory from

1867 consist of a set of formulae which describe the behavior of

electric and magnetic field proparation. The theory was from
the beginning an "aether" or mechanical theory, but this
interpretation of electromagnetism later on was denyed.
Today only a barren shell of mathemaical formalism reaminds
which not say much of cause and source of electromagnetism.
The scientific value of these formulae therefore may be put into
question since they seem to have be overestimated in importance.

However, the most famous are:

(44a) ==========================

__ _
!/ E = 0 The electric field at free
radiation from ap point source
(44b) ==========================

__ _
!/ B = 0 The magnetic field at free

(44c) ==========================

__ _ _
!/ E = −D B/Dt (D is the partial derivative)

(44d) ==========================

__ _ 2 _
!/ B = (1/c).D E/ Dt

DERIVING THE FORMULAE

Because of limit of space, 44a and 44b are not derived here. However, it is a relatively easy task to get these results, which are achived by deriving the field strength out from an electric or magnetic point source in respect to its coordinates, x,y and z. Therefore, we concentrate ourselves only on the two remaining formulae, which mainly are got by vectorially manipulating the base equation (30). (44c) is achived by taking the time derivative of this equation, the (44d) is got by taking the space derivative of it.

(45) ================================

_ _
_ E x v
B = −−−−2−− (from 30)
c

_ _
_ E x v
DB/Dt = D/Dt (−−−−2−−−−) =
c

__ _ 2 _ _ 2 2 __ _
!/ v/ c.(E x v) = −v /c .(!/ x E)

__ _
For v=c DB/Dt = − !/ X E

(46) ===

__ _ __ _ _ 2
!/ x B = !/ x (E x v/c)

__ _ _ __ _ _ __ _ _ __ _
!/ x B = DE/Dt − v(!/.E) − (E. !/).v + E(!/.v)

!−−−−−−−−−−−−/ !−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−/
Result Will be zero for a non accelerating
according to point source
Maxwell

__ _ _
!/ x B = DE/Dt The result in accord with
Maxwell valid for a non
accelerating point source

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LIGHT AND ELECTROMAGNETIC WAVES

Beside these famous equations treated above, historically Macwell is famous for predicting electromagnetic fields propagating in in the same way as light in free space. The conclusions were made on basis of comparing results from the general wave equation based on how sound in air or mechanical waves were propagating in a medium, air and water for instance. But the modern physics do not confess any existence of a light bearing aether, and the contradictionary problem in Maxwell's theories therefore still remain.

Vectorial manipulations are performed on results from (45) and (47) as shown in below.

(48) ===

__ _ _
!/ x E = −DB/Dt (from 45)

__ _ 2 _
!/ x B = 1/c . D/Dt .E (from 47)

__ __ _ __2 _ __ __ _ __2 _
!/ x (!/ x E) ? − !/ E + !/(!/ E) = − !/ E
__ _
(!/ E is equal to zero for a point source)

__ __ _ __ _ __ _
!/ x (!/ x E) = − !/(DB/Dt) = − D/Dt(!/ x B) =

2 _ 2 2 2 _
D/Dt(1/c.D/Dt.E) = 1/c .D /Dt .E

__ _ 2 2 2 _
− !/ E = 1/c . D /Dt .E

(49) ==

__ _ _
!/ x E = DB/Dt (from 45)

__ _ 2 _
!/ x B = 1/c .D/Dt.E (from 47)

__ __ _ __2 _ __ __ _ __2 _
!/x(!/ x B) = − !/ B + !/(!/ B) = − !/ B

__ _
(!/ B is zero for a point source =

__ __ _ __ 2 _
!/ x (!/ x B) = !/(1/c. D/Dt.E) =

2 __ _ 2 2 2 _
1/c .D/Dt(!/ x E) = 1/c . D /Dt .B

__2 _ 2 2 2 _
− !/ B = 1/c . D /Dt .B

==

The general wave equation is written :

(50) ==============================

__2 2 2 2
!/ Y = 1/v . D /Dt . Y

==================================

The mathematical structure of (48),(49) and (50) is the same and it was this mathematical equivalency which gave Maxwell the idea of light being a medium carried wave. Since then many experiments have been perfomed by light, clearly showing that no active light aether do exist. Only the mathematical equivalency reamin intact.

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