A collaborative LaTeX document

Class of ID2090, Third Trimester of 2021 batch

June 14, 2022

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1 Introduction

This file includes tex files from the folders of each student. The students are expected to update the file named after their roll number and place any images in the same folder. Students do not have to edit this master document. Once the student has sent a pull request which is accepted and processed successfully, his/her assignment submission is deemed to be complete.

You are also welcome to add references and cite them. Examples on how to do that are on the course repository [**?**].

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Assignment 4 Sankar M, CE21B115 June 2022

15.1 Maxwell's equation

$$\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\epsilon_0} \tag{1}$$

$$\vec{\nabla} \cdot \vec{B} = 0 \tag{2}$$

$$\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t} \tag{3}$$

$$\vec{\nabla} \times \vec{B} = \mu_0(\vec{J} + \epsilon_0 \frac{\partial \vec{E}}{\partial t}) \tag{4}$$

Symbols	Explanation
μ_0	permeability of free space
ϵ_0	permittivity of free space
ρ	electric charge density, charge per unit volume
$\vec{J}$	free current density, current per unit area
$\vec{E}$	Electric Field
$\vec{B}$	Magnetic Field

∇	denotes the gradient operator, del
$\nabla\cdot$	denotes the divergence operator
$\nabla\times$	denotes the curl operator

Ampere stated the relation between magnetic field and electric current. Maxwell added that magnetic field can also be related to changing electric field which he called as displacement current, $\vec{J_d} = \epsilon_0 \frac{\partial \vec{E}}{\partial t}$.As a result of Maxwell's addition, ampere's law was true even when it is not a static condition.

Maxwell's equation highlights the fact how the divergence and curl of electric and magnetic fields are related. They say that the electric fields can be produced by charges(ρ) or by changing magnetic fields($\frac{\partial \vec{B}}{\partial t}$). And magnetic fields can be produced either by currents($\vec{J}$) or by changing electric fields($\frac{\partial \vec{E}}{\partial t}$)

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44 Conclusions

If this master tex file could be compiled successfully, it means that the class has learnt the concepts of Git as well as LaTeX properly.

45 References

References

[1] Repository for id2090 course. `https://github.com/gphanikumar/mm2090`. Accessed: 2022-06-13.