ECC 203 : Electromagnetics and Radiating Systems

Faraday's Law

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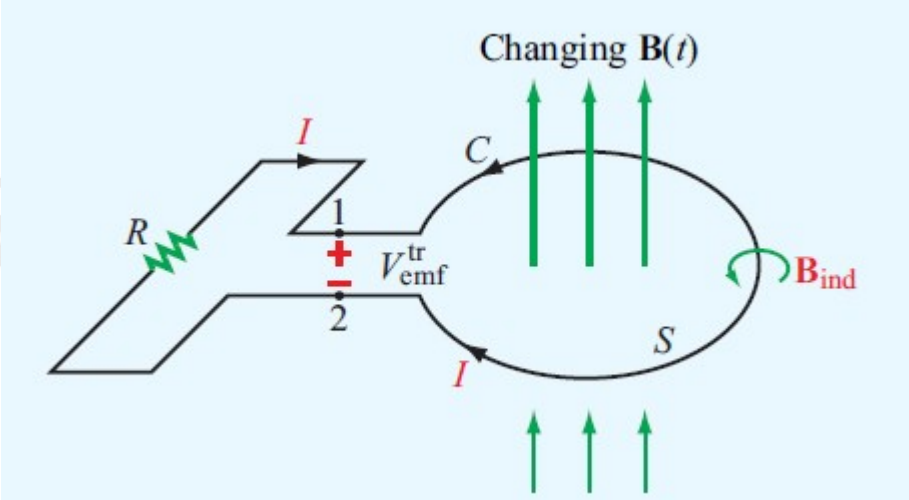
Faraday's Law

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t} \quad \text{(Faraday's law).}$$

$$\oint_C \mathbf{E} \cdot d\mathbf{l} = -\int_S \frac{\partial \mathbf{B}}{\partial t} \cdot d\mathbf{s},$$

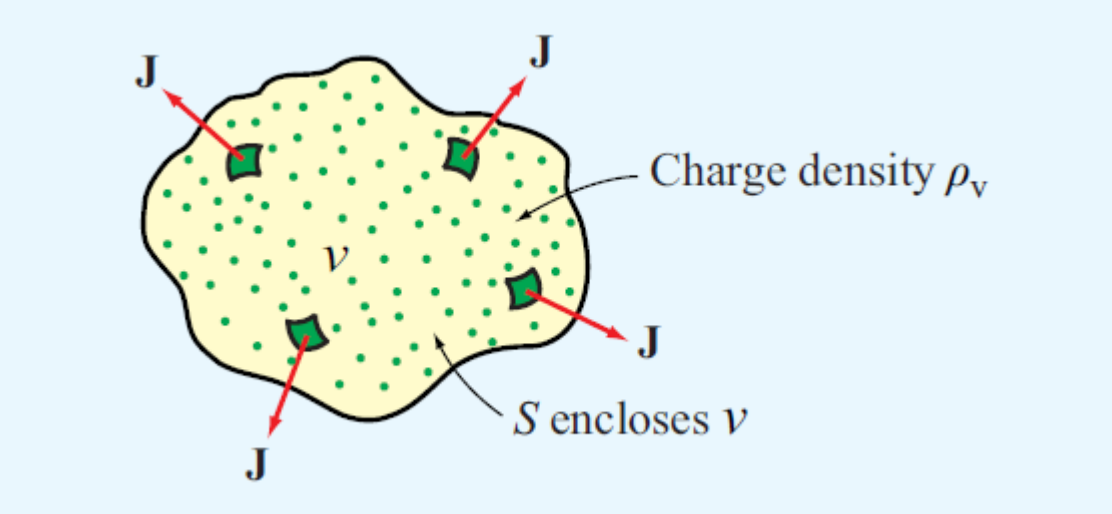


E field → Non-Conservative field

https://em8e.eecs.umich.edu/jsmodules/ulaby_modules.html

https://www.youtube.com/watch?v=nGQbA2jwkWI

Charge-Current Continuity Relation



$$I = -\frac{dQ}{dt} = -\frac{d}{dt}\int_v \rho_v \, dv,$$

$$\oint_S \mathbf{J} \cdot d\mathbf{s} = -\frac{d}{dt}\int_v \rho_v \, dv.$$

$$\nabla \cdot \mathbf{J} = -\frac{\partial \rho_v}{\partial t}$$

Thank You

Questions?