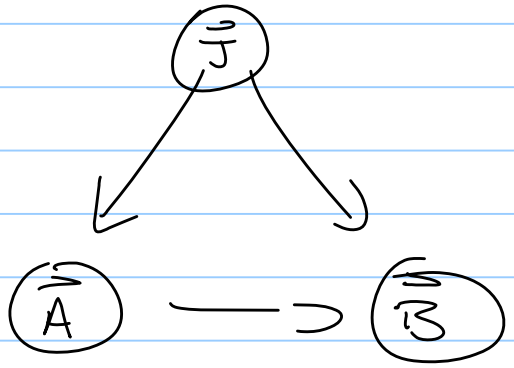
Note Title 4/13/2009

Review: 5.4.3, 7.3.5, 7.3.6 } will not be on exam

Ch 5:



$\vec{F} = q\vec{v} \times \vec{B} + q\vec{E}$ from $\rightarrow$ $d\vec{F} = I d\vec{\ell} \times \vec{B}$

$= \vec{K} \times \vec{B}\, da$

$= \vec{J} \times \vec{B}\, d\tau$

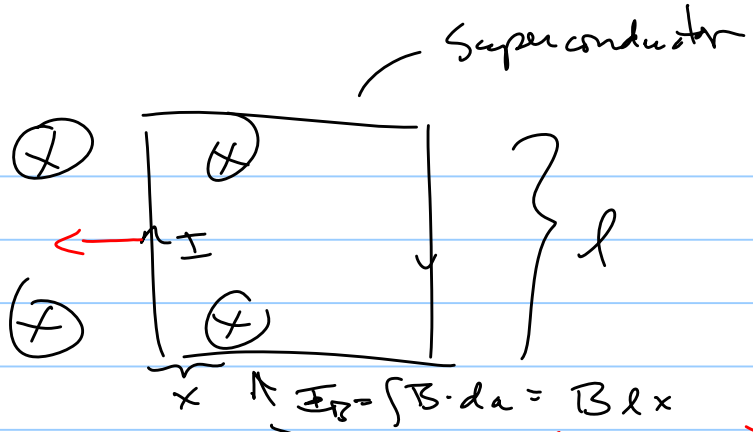
Ch 7: Ohms Law $\vec{J} = \sigma \vec{E} \Rightarrow \vec{\nabla} \cdot \vec{E} = \frac{1}{\sigma} \underbrace{\vec{\nabla} \cdot \vec{J}}_{-\frac{\partial \rho}{\partial t} = 0} = \emptyset$

Cons charge $\vec{\nabla} \cdot \vec{J} = -\frac{\partial \rho}{\partial t}$

Faradays $\mathcal{E}mf = -\frac{\partial \Phi_B}{\partial t}$ $\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$

Amps Law $\vec{\nabla} \times \vec{B} = \mu_0 \vec{J} = \mu_0 \underbrace{\vec{J}}_{\text{charge}} + \mu_0 \epsilon_0 \underbrace{\frac{\partial \vec{E}}{\partial t}}_{\text{Displ. current}}$

Tablet Q



Fundamental Principles: $\vec{F} = m\vec{a} = q\vec{v}\times\vec{B} + q\vec{E}$

$\mathcal{E}mf = -\frac{d\Phi_B}{dt}$ $\qquad d\vec{F} = I d\vec{l} \times \vec{B}$

Method:

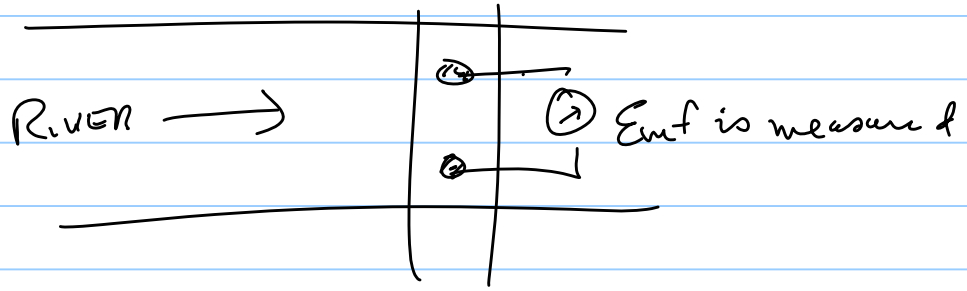
$$\mathcal{E}mf = -\frac{d\Phi_B}{dt} = -\frac{d\Phi_{B\,external}}{dt} - \frac{d\Phi_{current}}{dt} = 0$$

$$-Blv \qquad - \Phi_{current} = Li = 0$$

$$L\frac{di}{dt}$$

$$F = m\frac{dv}{dt} = IlB$$

Check: $B \to 0$ v is constant
$l \to 0$ v is constant



Principles: $\vec{F} = q\vec{v}\times\vec{B} + q\vec{E}$

Method: Charge in wire will move until $= F = 0$

Solve $qvB + qE = 0$

gives E

Need defn $\Delta V = -\int \vec{E} \cdot d\vec{l}$

Check: vel of wires $\to 0$ $\quad$ Emf $\to 0$

$B \to 0$ $\quad$ Emf $\to 0$