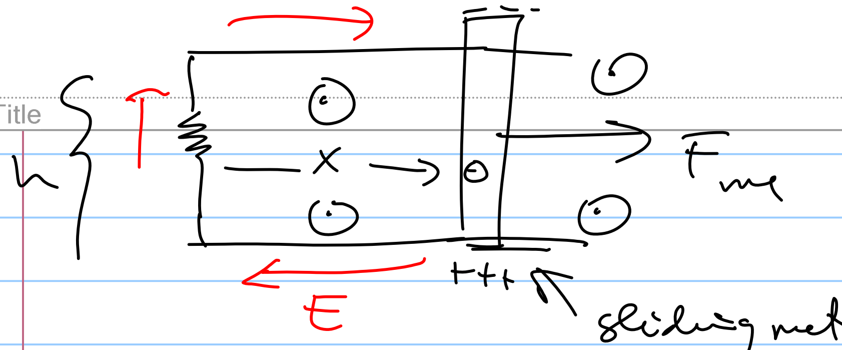
Note Title 4/9/2007



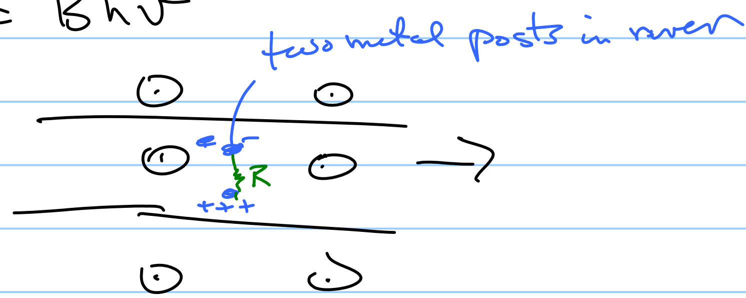
$q\vec{v}\times\vec{B}$

Emf (voltage) $= -\dfrac{d\Phi_m}{dt} \Rightarrow \left| \int \vec{E}\cdot d\vec{l} \right|$

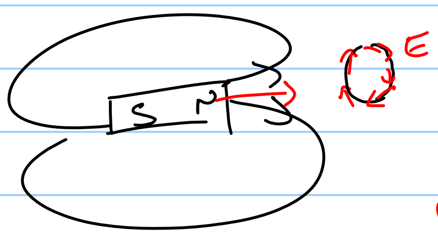
$\Phi_m = \int \vec{B}\cdot d\vec{a} = Bhx$

$\dfrac{d\Phi}{dt} = Bhv$

Ex: river



Ex:



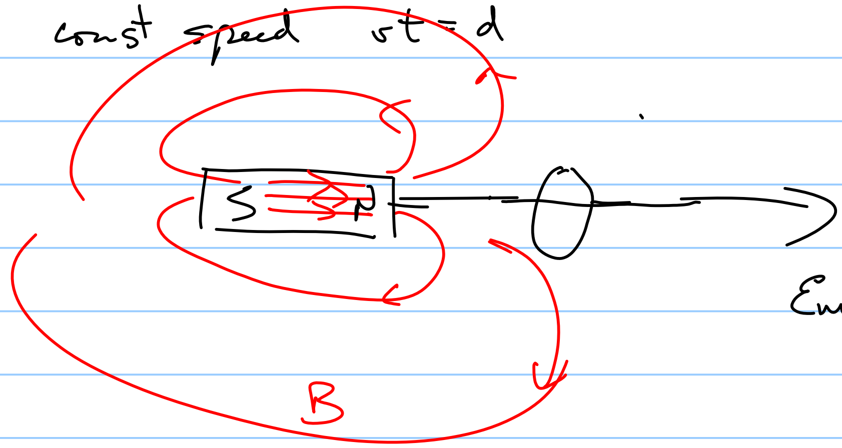
$\text{Emf} = -\dfrac{d\Phi_m}{dt}$

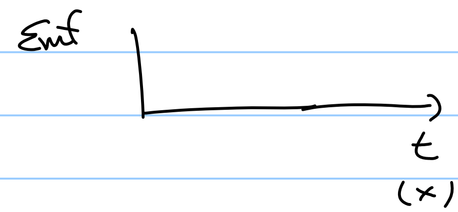
$\int \vec{E}\cdot d\vec{l} = \text{Emf} = -\dfrac{d\Phi_m}{dt}$

Can't be explained by using $q\vec{v}\times\vec{B}$

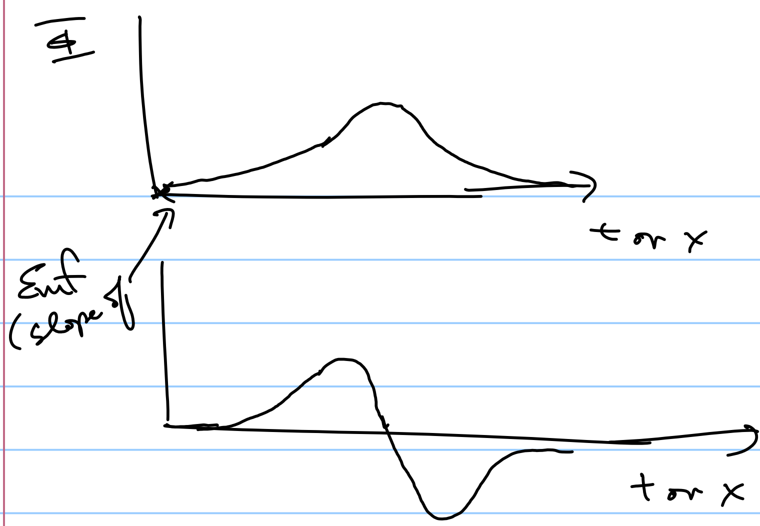
Sketch the emf in the loop shown as a bar magnetic traverses the loop.

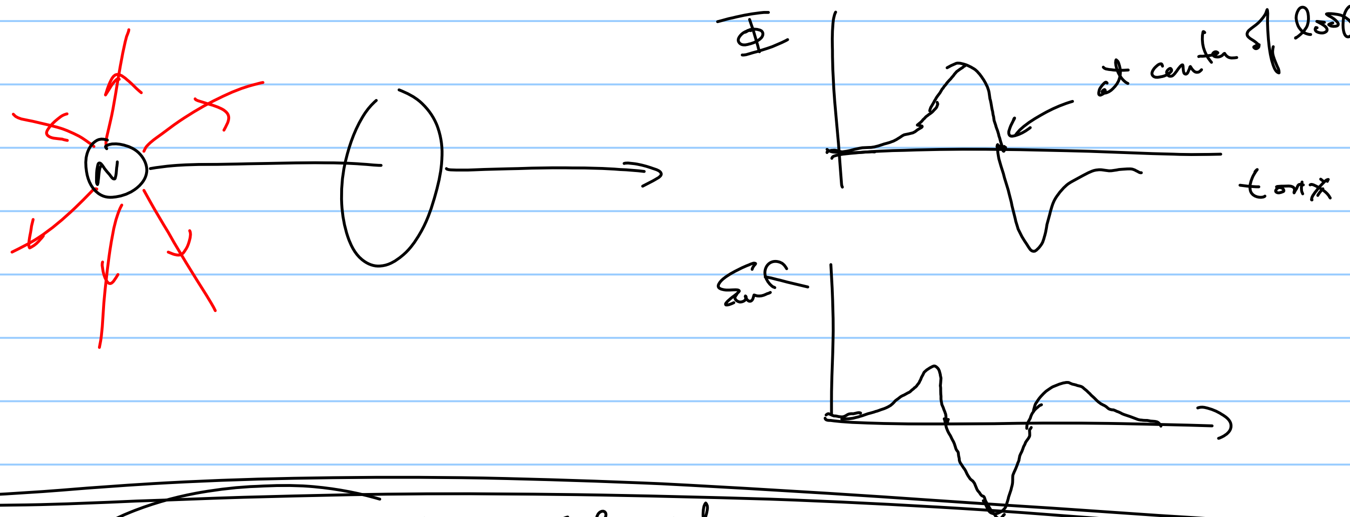
const speed $vt = d$

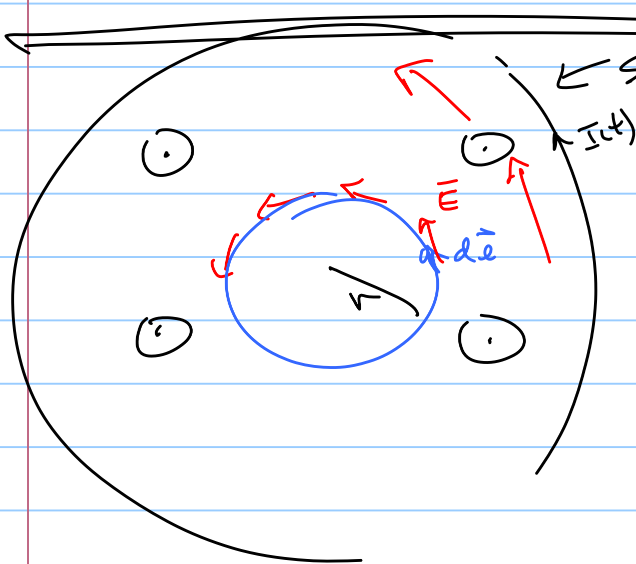




$\text{Emf} = -\dfrac{d\Phi}{dt}$







$\vec{B}(t)$

$$\mathcal{E}mf = -\frac{d\Phi_m}{dt}$$

"

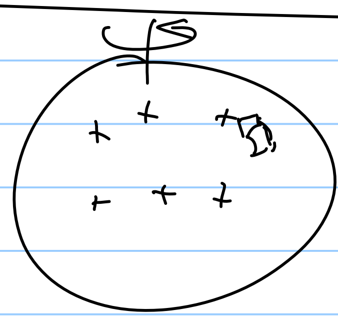
$$\oint \vec{E}\cdot d\vec{l} = -\frac{d\Phi_m}{dt} = -\frac{d}{dt}\int \vec{B}\cdot d\vec{a}$$

$$E\, 2\cancel{\pi} r = \frac{dB}{dt}\cancel{\pi} r^2$$

$$E(t) = \frac{dB}{dt}\frac{r}{2}$$

Exam

(1)



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

$$=$$

$r^2 \sin\theta\, d\theta\, d\phi\, dr$

$\int \quad \hat{r}$

(4) given $\vec{A}$ find $\vec{J}$

$$\vec{B} = \vec{\nabla} \times \vec{A} \qquad \vec{\nabla} \times \vec{B} = \mu_0 \vec{J}$$

$$\underbrace{\nabla^2 \vec{A}}_{\text{vector laplacian}} = -\mu_0 \vec{J}$$