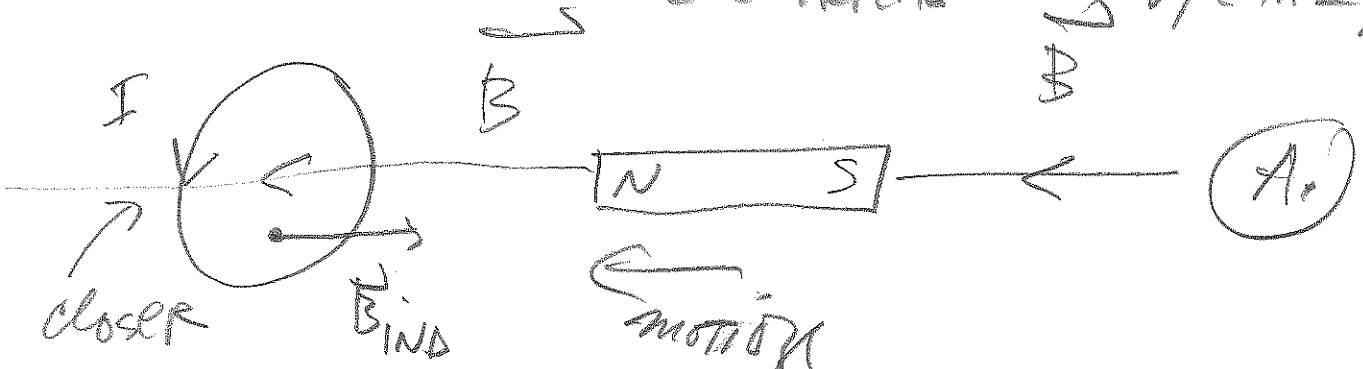
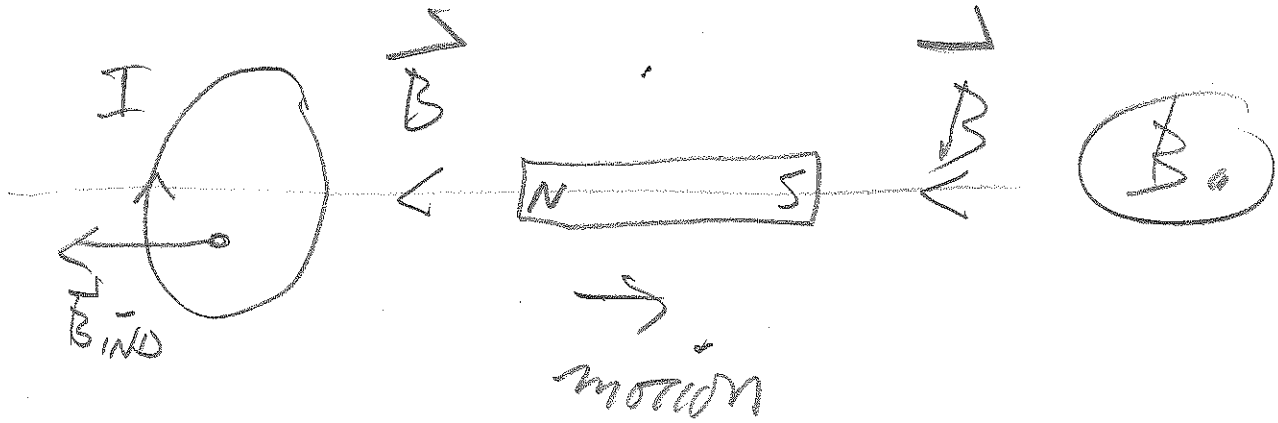
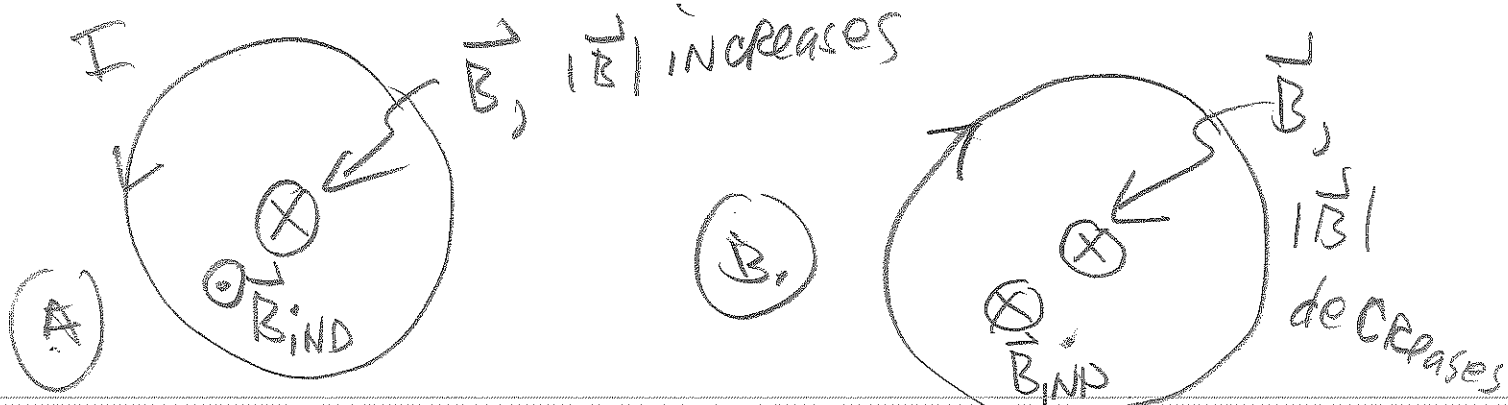
CH 29 — 4B 4-25-19

fig 29.1 : mechanical energy (motion) converted to ELECTRICAL energy (via I)

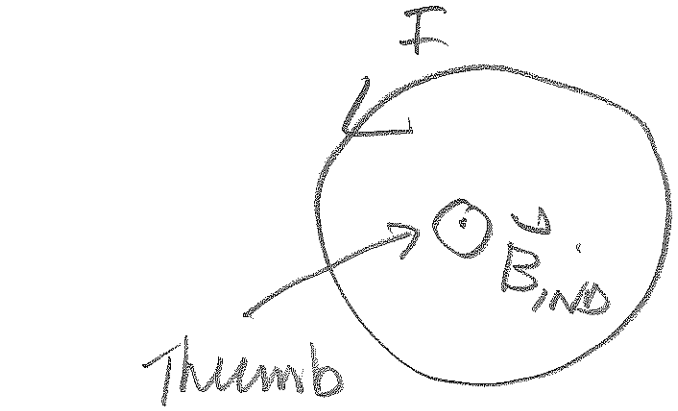




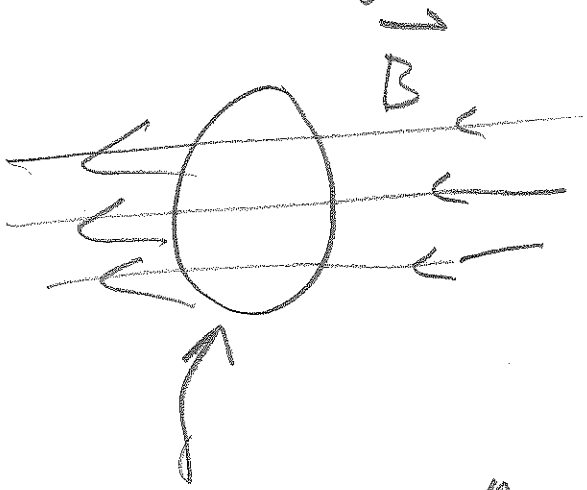
FRONT VIEWS



NOTE: Ch 28 helps w. $\mathcal{E}$ and $\vec{B}_{IND}$: see Sec 28.5.



Flux: Fig. 29.3, Fig. 29.4.



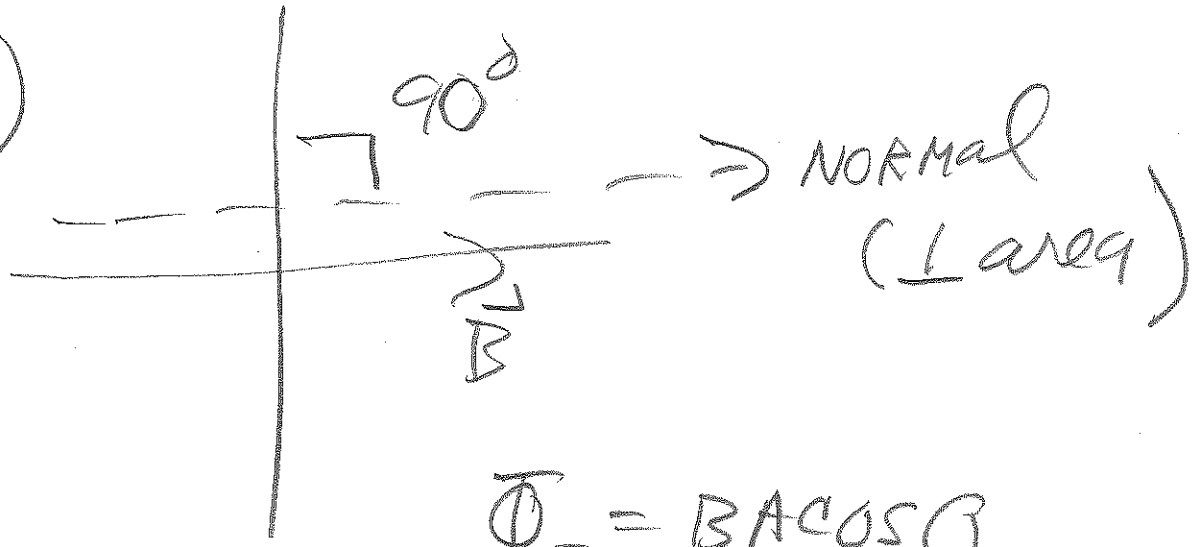
$$\Phi_B = B \cdot A,$$

$B = |\vec{B}|$ → magnitude

Flux: Fig 29.9

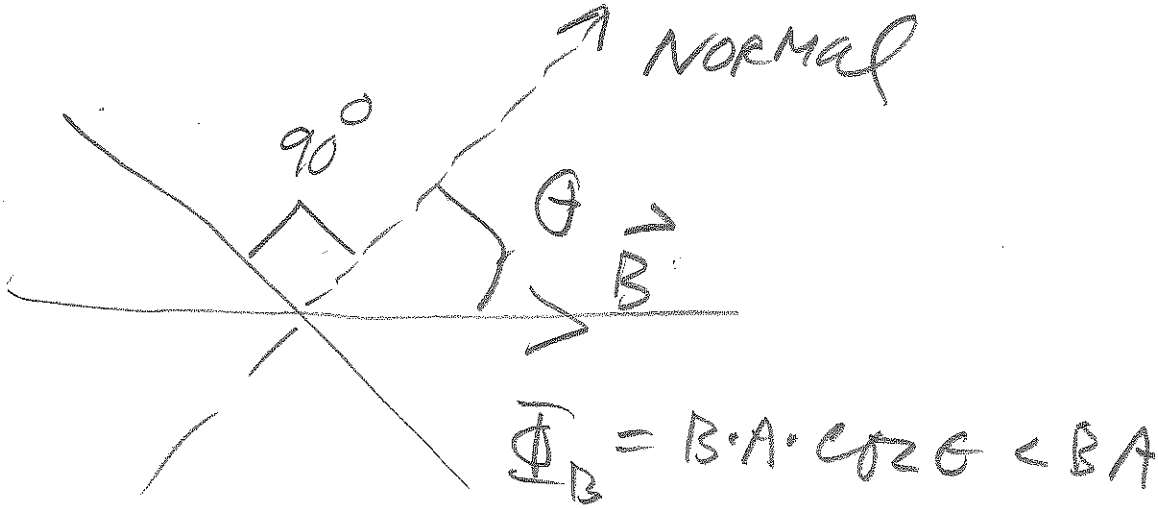
side views

(i)



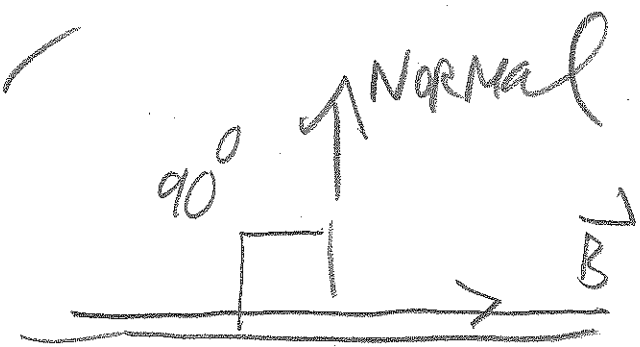
$\Phi_B = BA\cos\theta$

(ii)



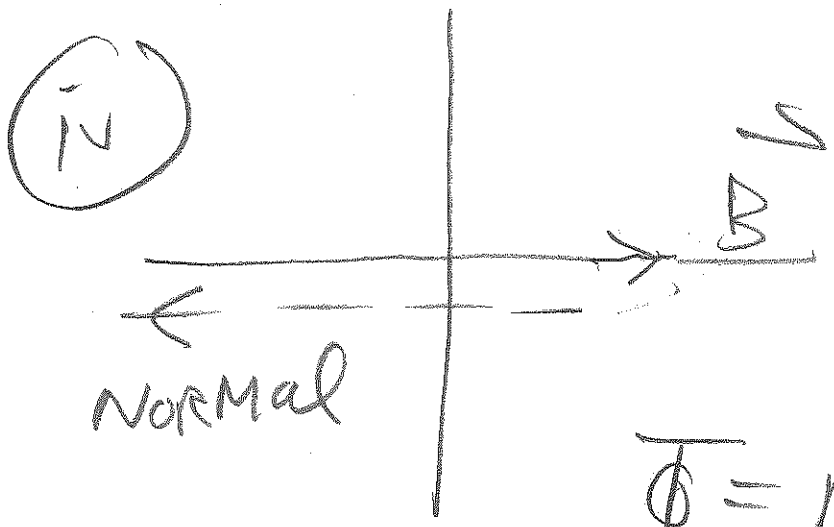
$\Phi_B = B \cdot A \cdot \cos\theta < BA$

(iii)



$\Phi_B = BA\cos 90$

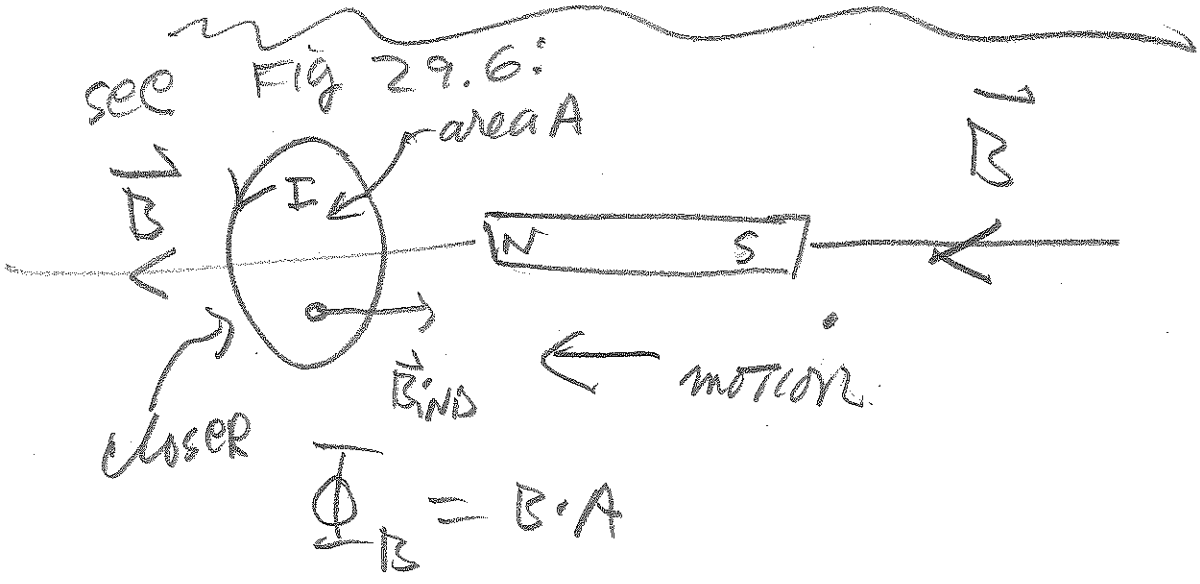
$= 0$



$$\Phi_B = BA\cos 180$$

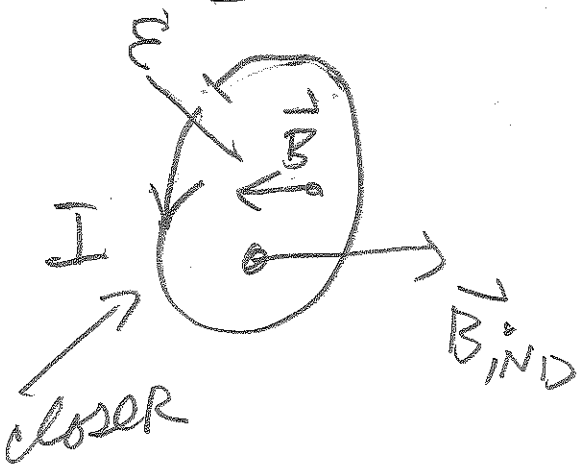
$$-1$$

$$= -B \cdot A$$



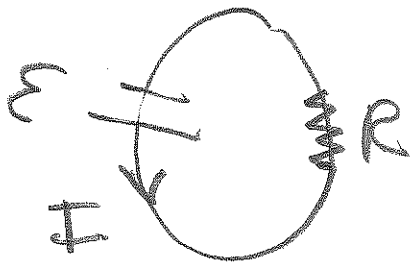
$$\Phi_B = B \cdot A$$

FARADAY'S MODEL:



$$\varepsilon = \left| \frac{\Delta \Phi_B}{\Delta t} \right|$$ steady STATE.

$$\varepsilon = \left| \frac{d\Phi_B}{dt} \right|$$ general



NOTE: $I = \frac{|\varepsilon|}{R}$

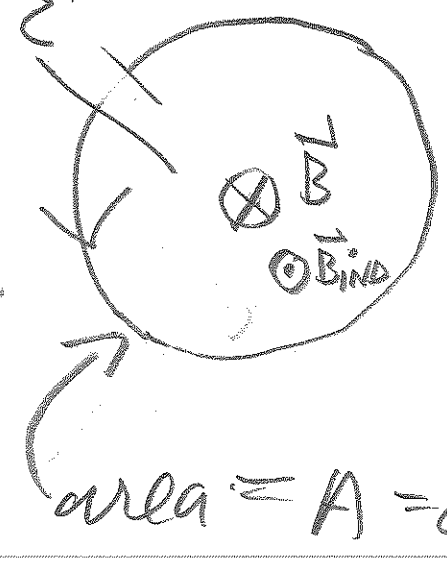
R = RESISTANCE

FRONT VIEW

$\Phi_B = B \cdot A$

$|\varepsilon| = \left| \frac{d(BA)}{dt} \right|$

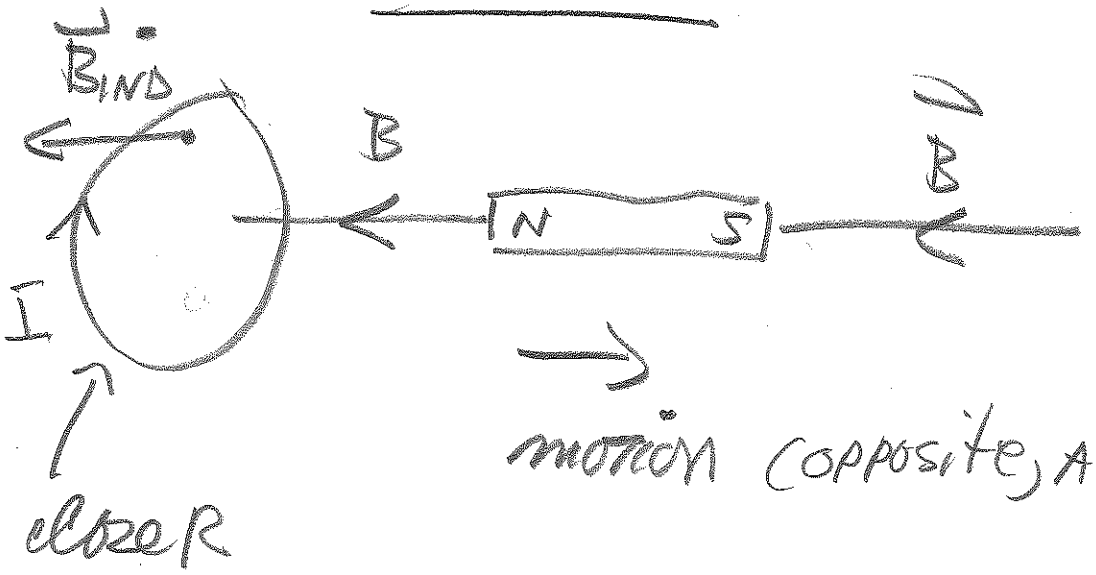
$= \left| A \frac{dB}{dt} \right|$



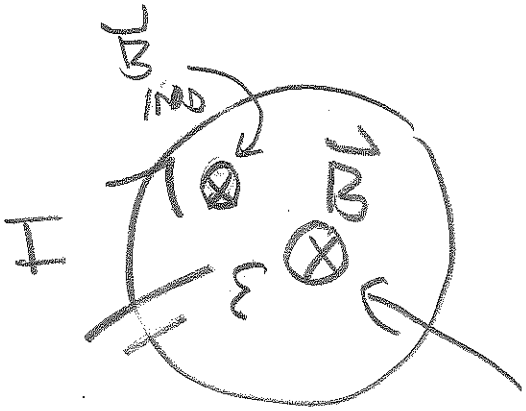
$|\vec{B}|$ INCREASES

$|\varepsilon| = \left| \frac{d\Phi_B}{dt} \right|$

Example:



FRONT VIEW



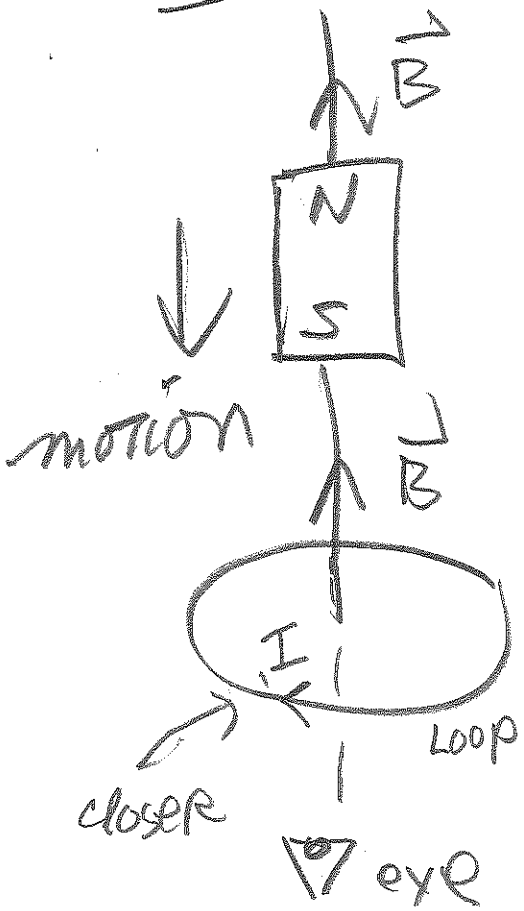
$$|\varepsilon| = \left| A \frac{d\vec{B}}{dt} \right|$$

$|\vec{B}|$ decreases

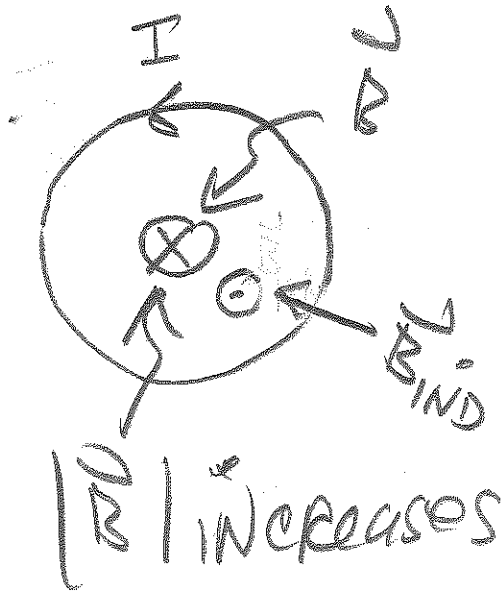
See Fig 29.14

Example

Fig 29.14 (d.)

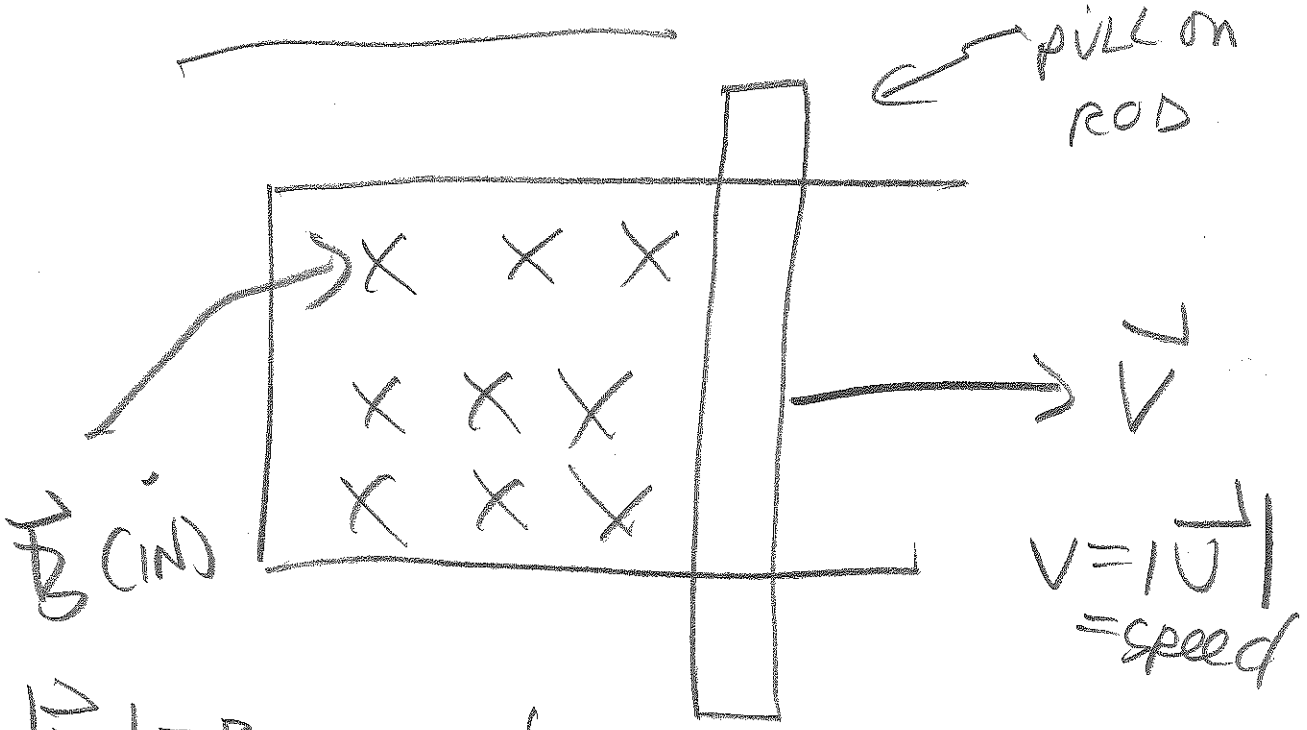


eye view



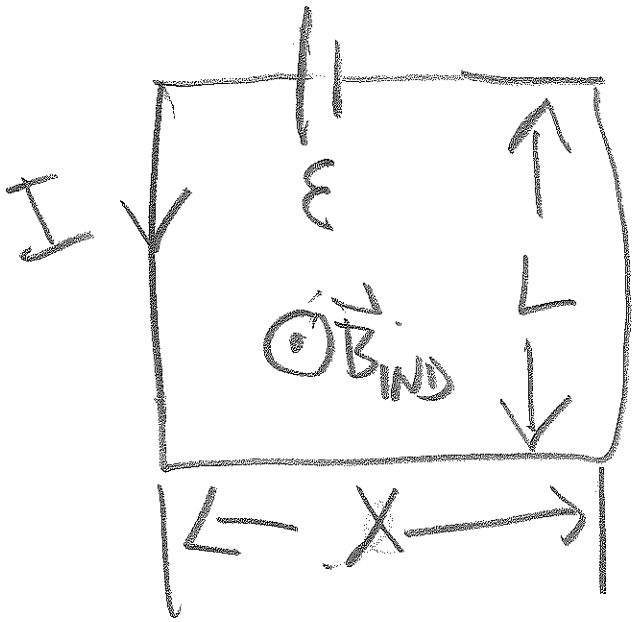
|B| increases

Sec. 29.4



$|\vec{B}| = B$.

$$|\varepsilon| = \left| \frac{d\Phi_B}{dt} \right|$$



$\Phi = B \cdot l \cdot x$

$$|\varepsilon| = \left| \frac{d(Blx)}{dt} \right|$$

$$= Bl \cdot \frac{dx}{dt} = Blv$$