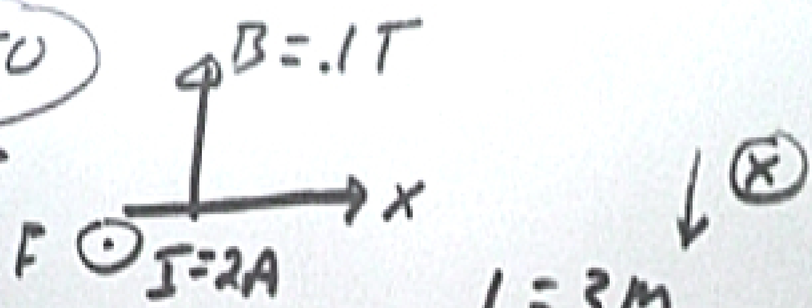
250



$L = 3m$

$\vec{F} = I\vec{L} \times \vec{B}$

$|\vec{F}| = 2 \cdot 3 \cdot .1 = 0.6\ N$

I: A

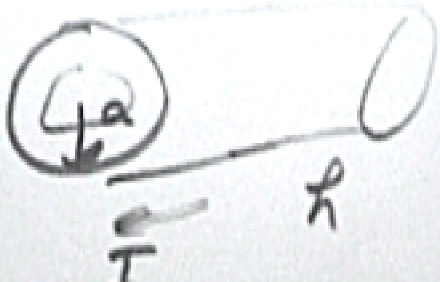
L: m

B: T $\left[\frac{N}{Am}\right]$

$\mathcal{E} = -\frac{d\phi}{dt}$

$V = \frac{Tm^2}{s}$

$T = \frac{Vs}{m^2}$ $\frac{Js}{Cm^2}$



$$J = \frac{I}{\pi a^2} \qquad \vec{B}:$$

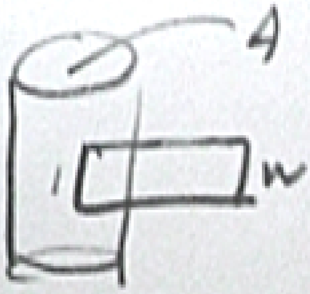
$$\oint \vec{B} \cdot d\vec{s} = \mu_0 I_c$$

$$B(2\pi r) = \mu_0 \left(I \left(\frac{r^2}{a^2} \right) \right)$$

$$B = \mu_0 I \frac{r}{2\pi a^2}$$

$$\Phi_m = \iint \vec{B} \cdot d\vec{A} \qquad L = \frac{\Phi_m}{I}$$

$$= 2\pi \int B \cdot r\,dr$$



N

ℓ

I

$$Bw = \mu_0 I (n w)$$

$$B = \mu_0 I n$$

$$\Phi_M = N (\mu_0 I n A)$$

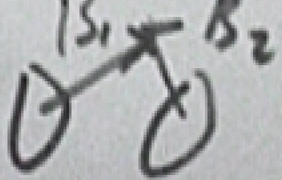
$$= \mu_0 n^2 I \underbrace{(A\ell)}_{Vol}$$

$$L = \frac{\Phi_M}{I} = \mu_0 n^2 (A\ell)$$

$$\cancel{U_m} \quad U_m = \frac{1}{2} L I^2$$

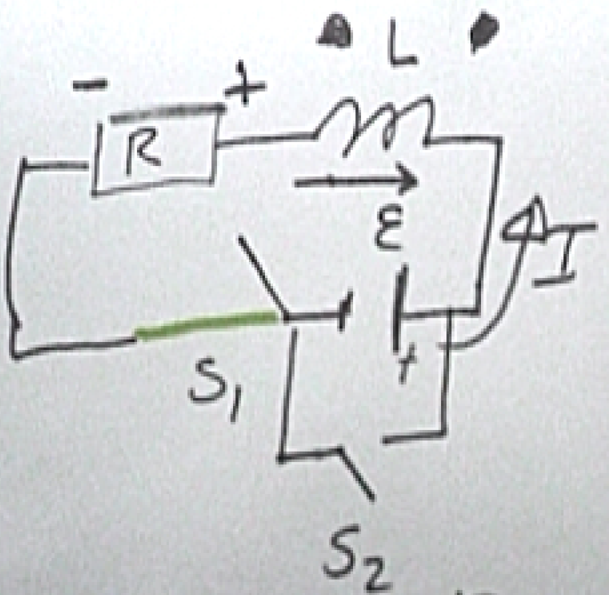
$$U_M = \frac{1}{2}\mu_0 n^2 (A\ell)\left(\frac{B^2}{\mu_0^2 n^2}\right)$$

$$u_E = \frac{U_M}{(A\ell)} = \frac{B^2}{2\mu_0}$$



$$\vec{B} = \vec{B}_1 + \vec{B}_2$$

$$U_{E_1} + U_{E_2} \quad 2\vec{B}_1 \cdot \vec{B}_2$$



$$\mathcal{E} - L\frac{dI}{dt} - IR = 0$$

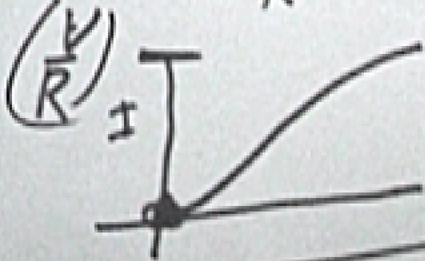
$$V - IR - L\frac{dI}{dt} = 0 \quad \left(\frac{V}{R} - I - \frac{L}{R}\frac{dI}{dt} = 0\right)$$

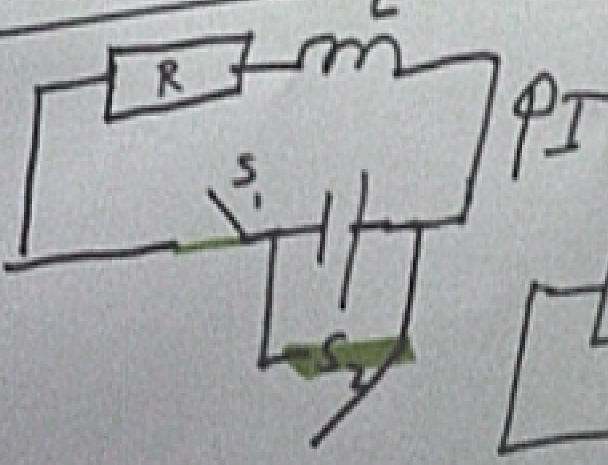
$$x \equiv \frac{V}{R} - I$$

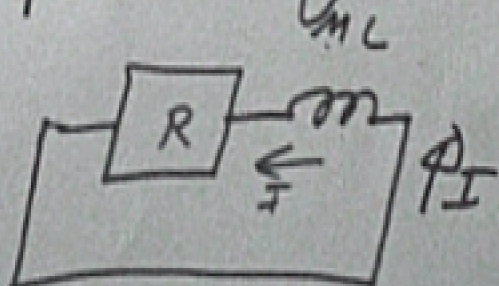
$$x + \tau\frac{dx}{dt} = 0 \qquad \tau = \frac{L}{R}$$

$$x = x_0 e^{-t/\tau}$$

$$I = \frac{V}{R}\left(1-e^{-t/\tau}\right)$$







$$V_L - IR = 0$$

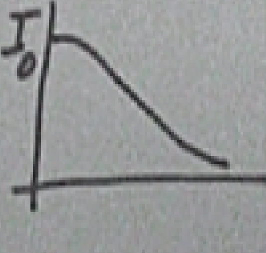
$$\mathcal{E} = -\frac{d\Phi_M}{dt} \Rightarrow V_L = -L\frac{dI}{dt}$$

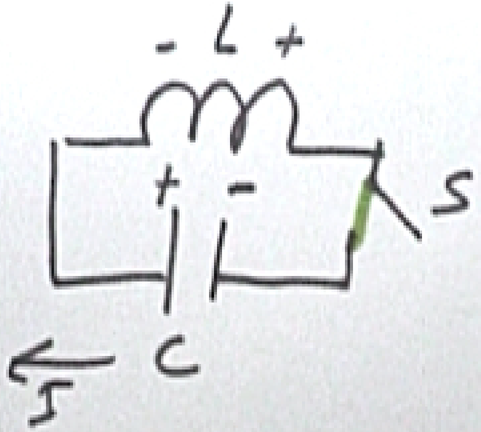
$$-L\frac{dI}{dt} - IR = 0 \qquad \div R$$

$$\frac{dI}{dt} = -\frac{I}{\tau} \qquad \tau = \frac{L}{R}$$

$$\int \frac{dI}{I} = \int -\frac{dt}{\tau} \Rightarrow \ln\left(\frac{I}{I_0}\right) = -\frac{t}{\tau}$$

$$I = I_0 e^{-t/\tau}$$





$$V_c - V_L = 0$$

$$V_c = \frac{q}{c} \qquad L_L = -L\frac{dI}{dt}$$

$$\frac{q}{c} + \frac{1}{L}\frac{dI}{dt} = 0$$

$$\frac{I}{c} + \frac{1}{L}\frac{d^2I}{dt^2} = 0$$

if $\tau = \frac{L}{R}$ $L = \frac{\Phi_M}{I}$ $\frac{d\Phi_M/ds}{dI/dt}$

$=$

$L = \frac{V}{A/s}$

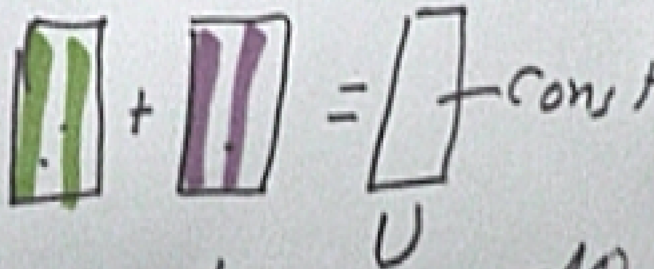
$\tau_{LR} = \frac{\cancel{V}/A/s}{\cancel{V}/A} = \frac{1}{\frac{1}{s}}$ $V = IR$

$= s$

$\tau_{RC} = RC$

$$\frac{d^2I}{dt^2} + \frac{I}{LC} = 0$$

$$I(t) = I_m \sin(\omega t + \phi)$$



$$\omega = \frac{1}{\sqrt{LC}} \qquad I = \frac{dQ}{dt}$$

$$V = -L\frac{dI}{dt}$$

$$U_m = \frac{LI_m^2}{2}\sin^2(\omega t+\phi)$$

$$U_e = \frac{Q_0^2}{2C}\cos^2(\omega t+\phi)$$