Magnetisk flux

Φ [Wb] $\quad B = \frac{\Phi}{A}$

$$\Phi = B \cdot A = \frac{F_m}{R_m}$$

$$B = \frac{F_m}{R_m \cdot A} = \frac{N \cdot I}{R_m \cdot A}$$

magnetisk motstand

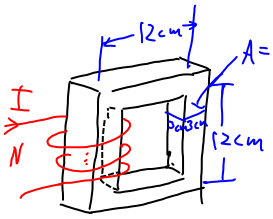
$$R_m = \frac{L}{\mu \cdot A}$$

L ← lengden

A ← areal

μ ← Permeabilitet

$$B = \frac{F_m}{R \cdot A} = \frac{F_m}{\frac{L}{\mu \cdot A} \cdot A} = \frac{F_m}{\frac{L}{\mu}} = \mu \cdot \frac{F_m}{L} = \mu H$$



$A = 3{,}0 \cdot 3{,}0\,[cm^2] = 0{,}03^2\,[m^2]$

$L = 4 \cdot 12\,cm = 0{,}48\,[m]$

$\mu = \mu_0 \cdot \mu_r = \underbrace{4\pi \cdot 10^{-7}}_{\mu_0 \,/\, (\mu)} \cdot \underbrace{800}_{\mu_r}$

$$R_m = \frac{L}{\mu \cdot A} = \frac{0{,}48\,[m]}{4\pi \cdot 10^{-7} \cdot 800\left[\frac{Wb}{At \cdot m}\right] \cdot 0{,}03^2\,[m^2]}$$

$9{,}0 \cdot 10^{-4}$

$$= \frac{0{,}48 \cdot 10^{11}}{3200 \cdot 9{,}0 \cdot \pi}\left[\frac{m}{\frac{Wb}{At \cdot m} \cdot m^2}\right]$$

$\left[\frac{At}{Wb}\right]$

$$= 0{,}53 \cdot 10^6 \left[\frac{At}{Wb}\right] \leftarrow R_m$$

turn

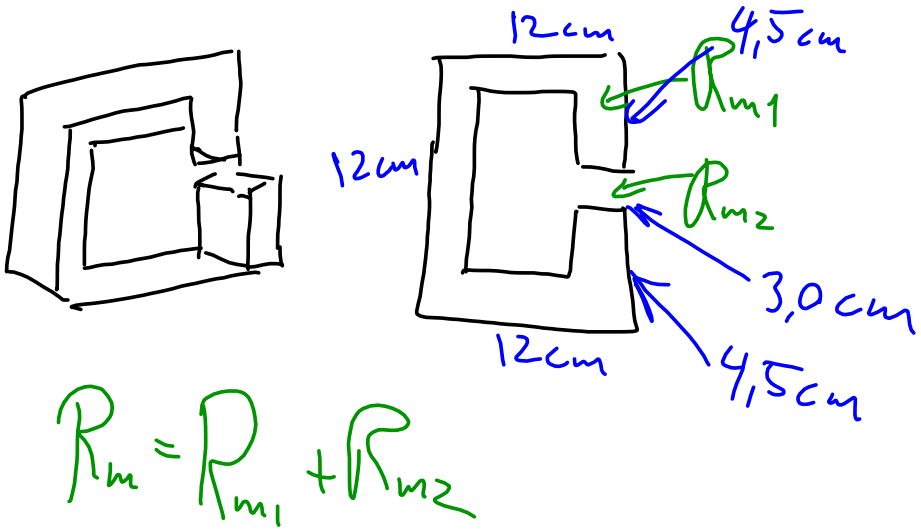
$N = 10$

$I = 1{,}0\,[A]$

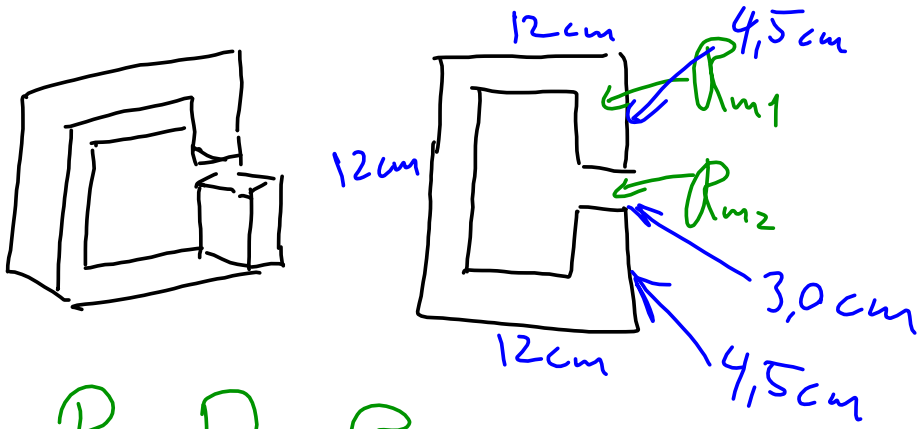
$$\Phi = \frac{N \cdot I}{R_m} = \frac{10 \cdot 1{,}0\,[A \cdot t]}{0{,}53 \cdot 10^6 \left[\frac{At}{Wb}\right]}$$

$$= 1{,}9 \cdot 10^{-5}\,[Wb]$$

$$B = \frac{\Phi}{A} = \frac{1{,}9 \cdot 10^{-5}\,[Wb]}{9{,}0 \cdot 10^{-4}\,[m^2]} = 0{,}2 \cdot 10^{-1}\,[T] = 20\,[mT]$$

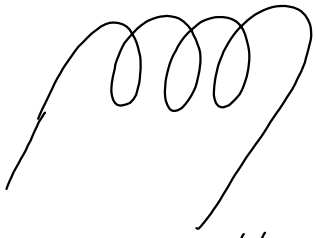


$$R_m = R_{m1} + R_{m2}$$



$$\mathcal{R}_m = \mathcal{R}_{m_1} + \mathcal{R}_{m2}$$

Spole



$$U_{ind} = -N\frac{d\Phi}{dt}$$

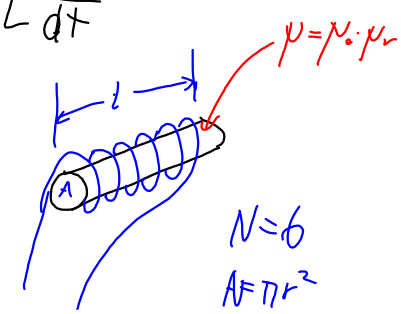
$$= -N \cdot A \frac{dB}{dt}$$

$$B = \mu \cdot H = \mu \frac{N \cdot I}{l}$$

$$U = -\frac{\mu \cdot N \cdot A}{l} \cdot \frac{N \cdot dI}{dt} = -\frac{\mu \cdot N^2 \cdot A}{l} \frac{dI}{dt}$$

$$L = \frac{\mu \cdot N^2 \cdot A}{l}$$

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



$N = 6$

$A = \pi r^2$

$r = \frac{d}{2} = \frac{2\,cm}{2} = 1{,}0\,cm = 1{,}0 \cdot 10^{-2}\,[m]$

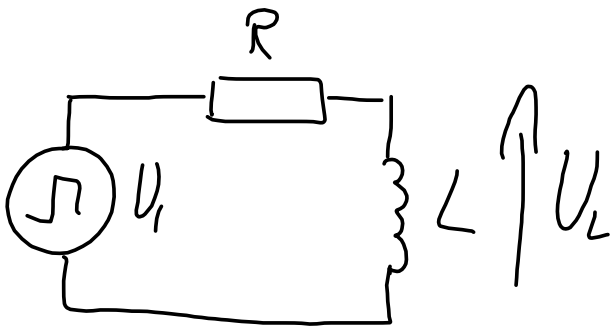
$A = \pi \cdot (1{,}0 \cdot 10^{-2})^2\,[m^2] = \pi \cdot 10^{-4}\,[m^2]$

$L = 3{,}0\,cm$ $\quad \mu_r = 800$

$$L = \frac{\mu_0 \cdot \mu_r \cdot N^2 \cdot A}{l} = \frac{4\pi \cdot 10^{-7} \cdot 800 \cdot 6^2 \cdot \pi \cdot 10^{-4}\,\left[\frac{Wb}{At \cdot m}\right]\left[m^2\right]}{0{,}03\,[m]}$$

$$= 3{,}8 \cdot 10^{-4}\,[H]$$

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



$$Z_L = j2\pi f L \qquad Z_C = \frac{1}{j2\pi f C}$$