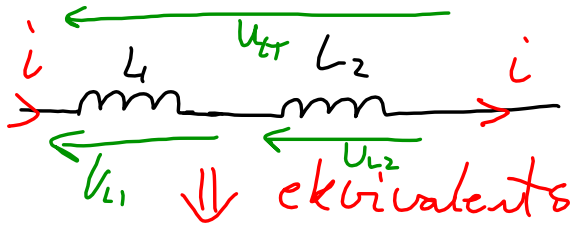
Induktans

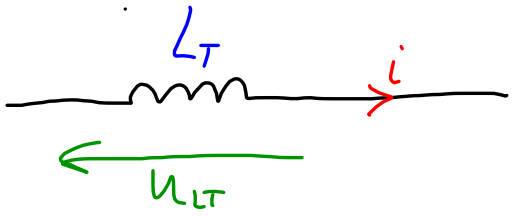
En spoles evne til å indusere en spenning, som et resultat av forandring av strømmen, og denne spenningen blir laget for å motsette seg forandring av strøm

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

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



⇓ ekvivalentskjema



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

$$U_{LT} = U_{L1} + U_{L2}$$

$$L_T\frac{di}{dt} = L_1\frac{di}{dt} + L_2\frac{di}{dt}$$

$$L_T = L_1 + L_2$$

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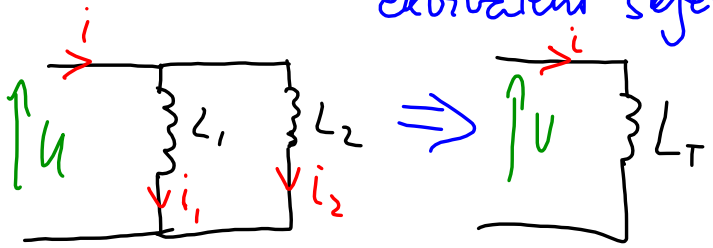

$i = i_1 + i_2$

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

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

$$U = L_T\frac{di}{dt} = L_T\frac{d(i_1+i_2)}{dt} = L_T\left(\frac{di_1}{dt} + \frac{di_2}{dt}\right)$$

$$U = L_T\left(\frac{U}{L_1} + \frac{U}{L_2}\right)$$

$$1 = L_T\left(\frac{1}{L_1} + \frac{1}{L_2}\right)$$

$$\frac{1}{L_T} = \frac{1}{L_1} + \frac{1}{L_2}$$

Oppsummering av magnetisme

Flux: Φ ← symbol $[Wb]$ — Weber

Fluxtetthet: $B = \frac{\Phi}{A}$ ← symbol $\left[\frac{Wb}{m^2} = T\right]$ — Tesla

Lorentzkraft $\vec{F} = q \cdot \vec{v} \cdot \vec{B}$

$U_{ind} = B \cdot l \cdot v$ — B: Fluxtetthet, l: lengde, v: fart

Permeabiliteten (= magnetisk ledningsevne)

μ ← symbol $\left[\frac{Wb}{A \cdot m}\right]$ ← benevnelse $\quad \mu = \mu_r \cdot \mu_0$

Reluktans R_m (= magnetisk motstand)

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

Magnetomotorisk spenning

$$F_m = N \cdot I$$

$$\Phi = \frac{F_m}{R_m}$$

Magnetisk feltstyrke

$$H = \frac{F_m}{l} = \frac{N \cdot I}{l} \qquad \left[\frac{A \cdot t}{m}\right]$$

H ← symbol

$$B = \mu \cdot H$$

Induktans $L = \frac{N^2 \cdot \mu \cdot A}{l}$ $[H]$

L ← symbol; H ← Henry

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

$$B = \mu \cdot \frac{NI}{l} \Rightarrow U_{ind} = \frac{\mu N^2 A}{l} \cdot \frac{di}{dt}$$