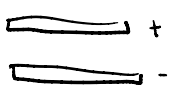
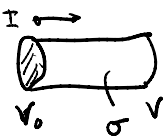
INDUKTANS

Elektrostatiskt

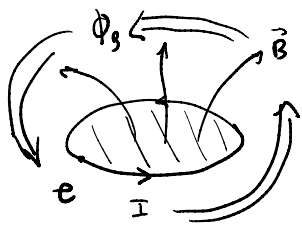


$C = \frac{Q}{V}$



$V = RI$

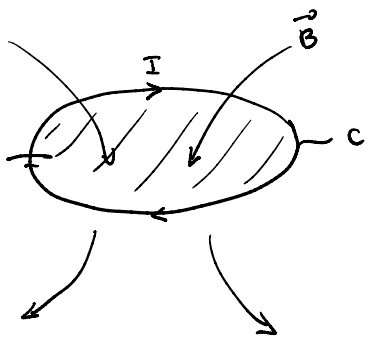
Magnetiska system



Induktans

$$\Phi_B = \int_S \vec{B} \cdot d\vec{S}$$

$$\vec{B} = \oint_C \frac{\mu_0}{4\pi} \frac{I d\vec{l} \times \vec{R}}{R^3}$$



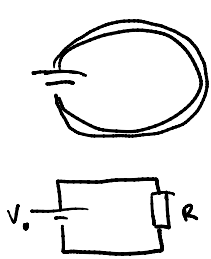
$B \propto I \Rightarrow \Phi_B \propto I$

$\Phi_B = L I$

L → Induktans

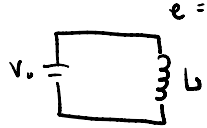
$$L = \frac{\Phi_B}{I}$$

Elektrostatiskt



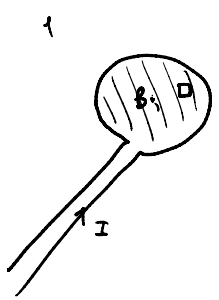
$V = RI$

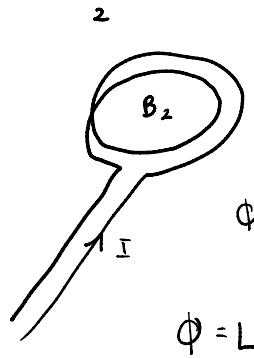




$e = -\frac{d}{dt} LI$

TEST





$B_1 \gtrless B_2$?

$B_2 = 2B_1$

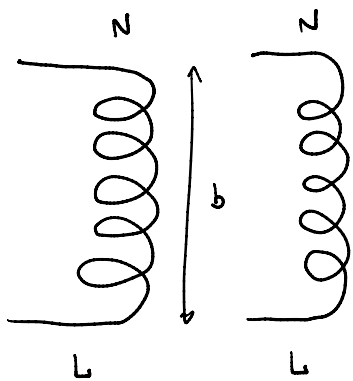
$\Phi_2 = 4\Phi_1$

$\Phi = L \cdot I$

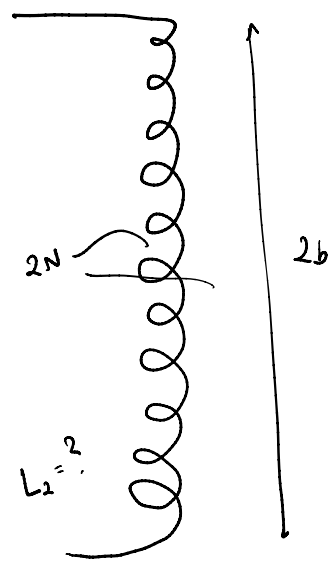
$L_1 \gtrless L_2$?

$\Phi_B = \int \bar{B}_2 \, d\bar{S} = 4 \int \bar{B}_1 \cdot d\bar{S}$

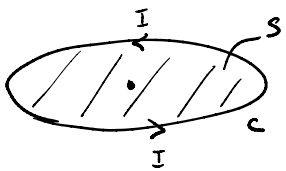
TEST



$B = \frac{\mu_0 N I}{b}$



Metode for L



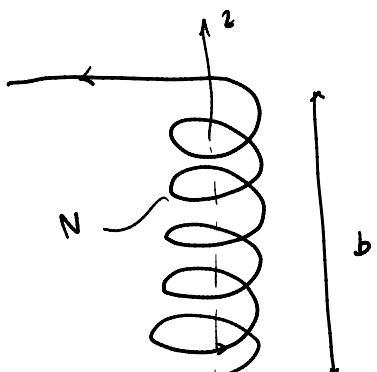
- Anta I
- Finn B ⟨ Biot-Savart / Ampères lov
- $\Phi_B = \int_S \bar{B} \cdot d\bar{S}$
- Finn $L = \Phi_B / I$. (Sjekk ideke er B eller I, uttrykket)

L for solenoide

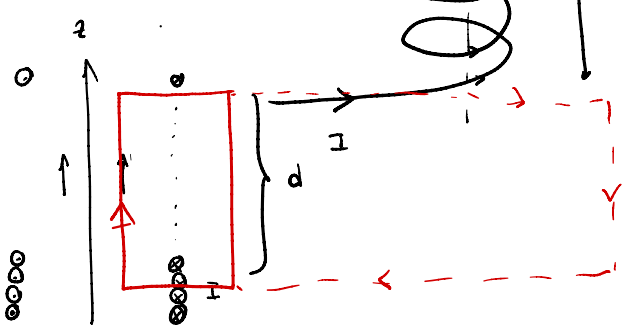
Ampères lov.

$\vec{B} = B_\varphi(r)\hat{\varphi} + B_z(r)\hat{z}$





Ampere lokke



$\oint \bar{B} \cdot d\bar{l} = \mu_0 I$

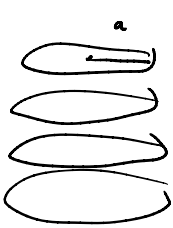
$B \cdot d = \mu_0 \frac{N}{b} d I$

$B_z = \frac{\mu_0 N I}{b}$

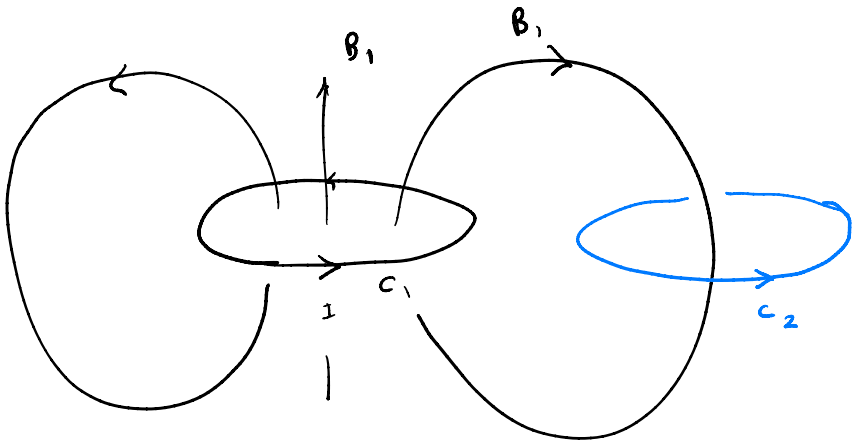
$\Phi_B = \int_S \bar{B} \cdot d\bar{S} = \frac{N \pi a^2 \mu_0 N I}{b}$

$\Phi_B = \frac{\mu_0 \pi a^2 N^2 I}{b}$

$L = \Phi_B / I = \mu_0 \pi a^2 N^2 / b$



Gensidig induktans



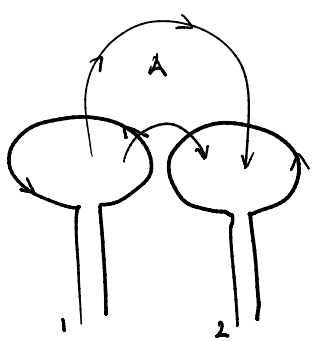
$$\Phi_{1,2} = \int_{S_2} \vec{B}_1 \cdot d\vec{S} = L_{1,2} I_1$$

kilde — flukes

Gensidig induktans.

TEST

$L_{1,2}$ størst?





Symmetri $L_{1,2} = L_{2,1}$

$$u = \frac{1}{2} \bar{D} \cdot \bar{E}$$

$$= \frac{1}{2} \bar{H} \cdot \bar{B}$$

