Elektrisk felt

$F_e = k_e \frac{q_1 q_2}{r^2}$

$\bar{E} = k_e \frac{Q}{r^2}$

$F_e = qE = k_e \frac{Qq}{r^2}$

Eks $Q = 1\,C$, $r = 1\,m$ V/m

$\bar{E} = k_e \frac{Q}{r^2} = 8{,}99\cdot 10^9 \frac{Nm^2}{C^2} \cdot \frac{1\,C}{(1\,m)^2} = 8{,}99\cdot 10^9 \,(N/C)$

$E_p = k_e \frac{Qq}{r}$

$q = e = 1{,}6\cdot 10^{-19}\,C$

$E_k = 0$

$E_p = k_e \frac{Qq}{r}$

$r = \infty$

$E_p = 0$

$E_k = \frac{1}{2} m v^2$

$k_e \frac{Qq}{r} = \frac{1}{2} m v^2$

$v = \sqrt{\frac{2k_e Qq}{mr}} = 1{,}3\cdot 10^7\,m/s \quad (> c\,!)$

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Homogent felt

$E = \frac{F}{q}$ $\quad F = qE$

$U = \frac{W}{q} = \frac{F\cdot d}{q} = \frac{qEd}{q} = Ed$

$E = U/d$

Eks

$\alpha = 25°$

$m = 10\,g$

$F_e = |q|E$

$= |q|\frac{U}{d}$

$G = mg$

$S_x = S\sin\alpha = F_e$

$S_y = S\cos\alpha = G$

$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{F_e}{G}$

$F_e = G\tan\alpha$

$|q|\cdot\frac{U}{d} = mg\tan\alpha$

$|q| = \frac{dmg}{U}\tan\alpha = 0{,}61\,mC$

$q = -0{,}61\,mC$

$d = 40\,cm$

$U = 30\,V$

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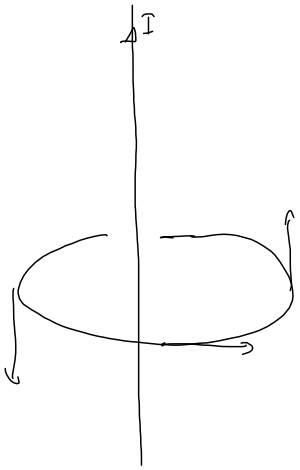
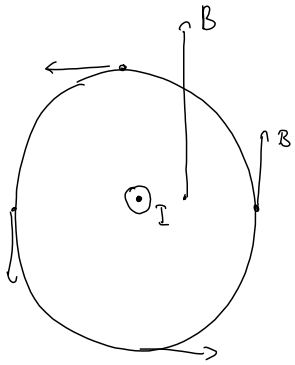
Magnetfelt fra leder





$B = k_m \frac{I}{r}$

k_m: $2 \cdot 10^{-7}\ Tm/A$

B

Eks $I = 1\ A$ $r = 1\ m$

$B = k_m \cdot \frac{1A}{1m} = 2 \cdot 10^{-7}\ T$

Fra Jorda: $\approx 5 \cdot 10^{-5}\ T$

$r = 1\ cm = 10^{-2}\ m$

$B = 2 \cdot 10^{-5}\ T$

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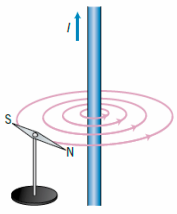
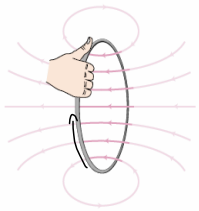
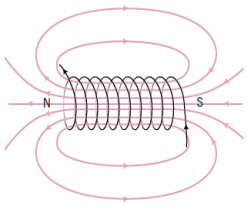
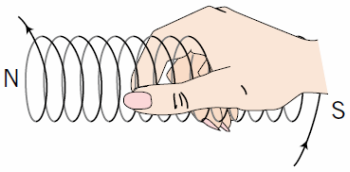
Magnetiske felt rundt strømførende ledere







Høyrehåndsregel 2

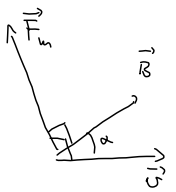


mai 10-10:28

Kraft på en ladet partikkel

El: $\vec{F}_e = q \cdot \vec{E}$

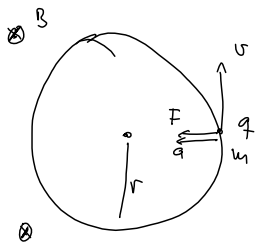
$\vec{F}_m = q\,\vec{v} \times \vec{B}$



$|\vec{F}_m| = F_m = q\,v\,B\sin\alpha$

$v \perp B$: $F_m = q\,v\,B$, $\alpha = 90°$, $\sin\alpha = 1$

$v \parallel B$: $F_m = 0$, $\alpha = 0°$, $\sin\alpha = 0$



$F_m = q\,v\,B = m\frac{v^2}{r}$

$r = \frac{mv}{qB}$

$T = \frac{2\pi r}{v} = \frac{2\pi \cdot mv}{qBv} = \frac{2\pi m}{qB}$

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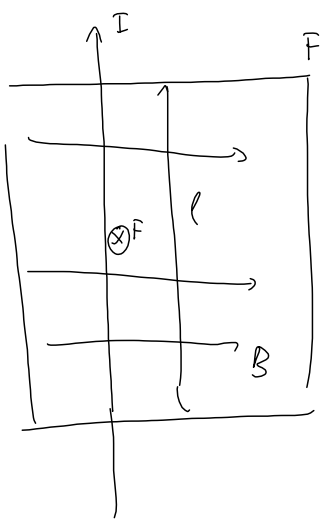
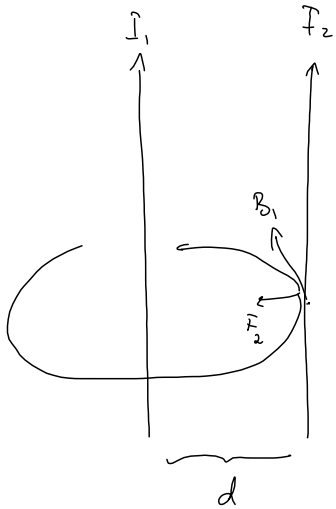
Kraft på en strømførende leder



$F = I \cdot l\,B$



$B_1 = k_m \cdot \frac{I_1}{d}$

$F_2 = I_2 \cdot l \cdot B_1$

$= k_m \cdot \frac{I_1 I_2}{d} \cdot l$

Ek.

$I_1 = 1{,}0\ A$

$I_2 = 2{,}7\ A$

$d = 5{,}0\ cm$

$l = 0{,}5\ m$

$F = 5{,}0 \cdot 10^{-6}\ N$

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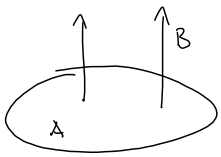
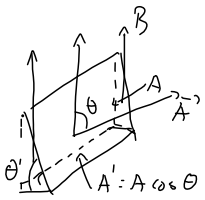
Magnetisk fluks

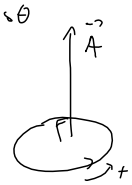


$\Phi = A \cdot B$



$\Phi = AB\cos\theta$

$= \vec{A} \cdot \vec{B}$



$|\vec{A}| = A$

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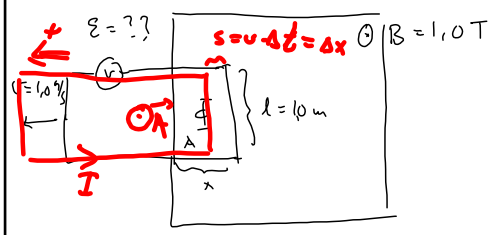
Induksjon

$\mathcal{E} = -\frac{\Delta\Phi}{\Delta t} = -\Phi'(t)$ $\quad \Phi = A \cdot B \cdot \cos\theta$



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

$\Delta\Phi = -B \cdot l \cdot \Delta x = -B \cdot l \cdot v \cdot \Delta t$

$\mathcal{E} = -\frac{\Delta\Phi}{\Delta t} = +Blv = +1{,}0\,V$

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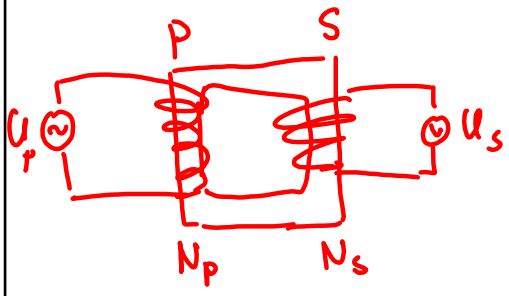
Transformator



$$\frac{U_s}{U_p} = \frac{N_s}{N_p}$$

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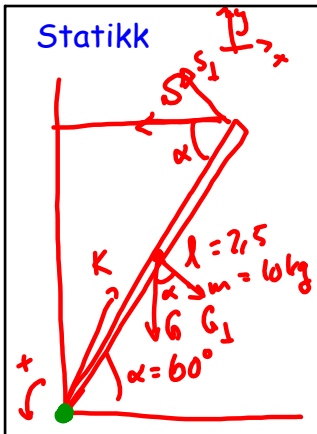
Statikk



$\sum F_x = K_x - S = 0 \qquad K_x = S$

$\sum F_y = K_y - G = 0 \qquad K_y = G$

$\sum M = M_G + M_S = -G\cos\alpha \cdot \frac{l}{2} + S\sin\alpha \cdot l = 0$

$M_G = -G_\perp \cdot \frac{l}{2} = -G\cos\alpha \cdot \frac{l}{2}$

$M_S = S_\perp \cdot l = S\sin\alpha \cdot l$

$S = \frac{G}{w_y}\frac{\cos\alpha}{\sin\alpha} \cdot \frac{1}{2}$

$= 28{,}3\ N$

$M = F_\perp r = Fr\sin\theta$

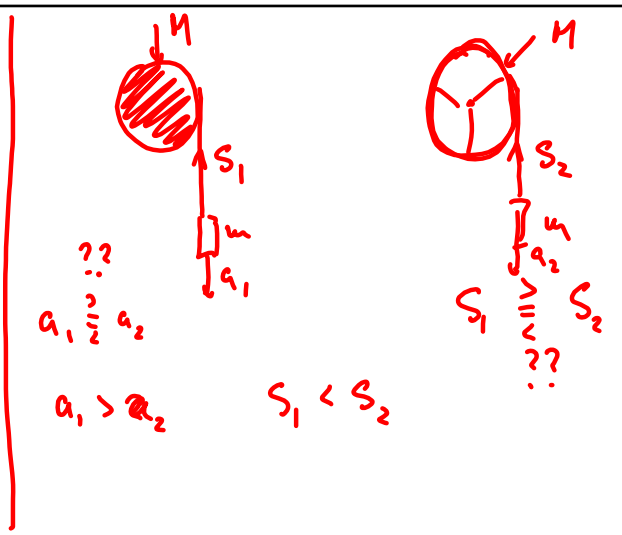
Mar 19-9:27 AM

Rotasjon

Treghetsmoment , I

Energi $E_k = \frac{1}{2} I \omega^2$

Spinn $L = I\omega$



Mar 19-9:27 AM

Fluidmekanikk

Hydrostatisk trykk

Hvor stort er trykket på havbunnen, 11 km under havflata?

Mar 19-9:27 AM

Pascals lov

Mar 19-9:29 AM

Oppdrift: Arkimedes' lov

Mar 19-9:31 AM

Bernoulli

Mar 19-9:31 AM

Viskositet

Mar 19-9:31 AM

Termofysikk

Temperatur: Indre kinetisk energi

Mar 19-9:32 AM

Tilstandslikninga for en idealgass

Mar 19-9:32 AM

Varmekapasitet

Mar 19-9:33 AM

Fasevarme

Mar 20-8:55 AM

Termofysikkens 1. lov

Termofysikkens 2. lov

Mar 20-8:56 AM

May 26-9:32 AM