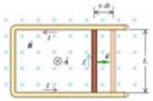
Kap. 29: Oppsummering: Elektromagnetisk induksjon

- Faradays lov for homogent ***B***-felt og plan strømsløyfe:

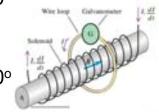
  $\mathcal{E} = -\,\mathrm{d}\Phi_B/\mathrm{d}t = -\,\mathrm{d}/\mathrm{d}t\,\{B(t) \cdot A(t) \cdot \cos\varphi(t)\}$

- Tre ulike tilfeller:

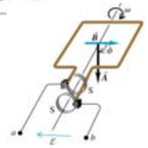
  1) Bevegelsesindusert, endring i *A(t)*:
     $\mathcal{E} = -\,\mathrm{d}\Phi_B/\mathrm{d}t = -\,B \cdot \mathrm{d}A(t)/\mathrm{d}t \cdot \cos 0^{\circ}$



  2) Tidsvariasjon i *B(t)*:
     $\mathcal{E} = -\,\mathrm{d}\Phi_B/\mathrm{d}t = -\,\mathrm{d}B(t)/\mathrm{d}t \cdot A \cdot \cos 0^{\circ}$



  3) Rotasjon, endring i *φ(t)*:
     $\mathcal{E} = -\,\mathrm{d}\Phi_B/\mathrm{d}t = -\,B \cdot A \cdot \mathrm{d}(\cos\varphi)/\mathrm{d}t$



Kap. 29: Oppsummering: Elektromagnetisk induksjon

- Faradays lov:

  $\mathcal{E} = -\,\mathrm{d}\,\Phi_B/\mathrm{d}t$, der $\Phi_B = \int \boldsymbol{B}\cdot\mathrm{d}\boldsymbol{A}$.

  Dvs: endring i magnetisk fluks Φ_B induserer ems.

  Generelt, induksjon av ***E***-felt i lukket kurve:

  $\int \boldsymbol{E} \cdot \mathrm{d}\boldsymbol{s} = \mathcal{E} = -\,\mathrm{d}\,\Phi_B/\mathrm{d}t$

- Lenz' lov: Indusert strøm motsetter seg fluksendringen.
- Virvelstrømmer.
- Forskyvningsstrøm: $I_d = \mathrm{d}\Phi/\mathrm{d}t$, der $\Phi = \int \boldsymbol{D}\cdot\mathrm{d}\boldsymbol{A}$.

  Modifikasjon av Amperes lov:

  $\int \boldsymbol{B} \cdot \mathrm{d}\boldsymbol{s} = \mu_0\,(I + I_d)$ $\qquad$ $\int \boldsymbol{H} \cdot \mathrm{d}\boldsymbol{s} = I + I_d$

  Differensialform: curl $\boldsymbol{H} = \boldsymbol{J} + \partial\boldsymbol{D}/\partial t$

Maxwells likninger i Notat 4

Integralform		Differensialform
$\oint \vec{D}\cdot\mathrm{d}\vec{A} = Q$	Gauss' lov ***D***	$\vec{\nabla}\cdot\vec{D} = \rho$
$\oint \vec{B}\cdot\mathrm{d}\vec{A} = 0$	Gauss' lov ***B***	$\vec{\nabla}\cdot\vec{B} = 0$
$\oint \vec{H}\cdot\mathrm{d}\vec{\ell} = I + \frac{\partial\Phi}{\partial t}$	Amperes lov	$\vec{\nabla}\times\vec{H} = \vec{J} + \frac{\partial\vec{D}}{\partial t}$
$\oint \vec{E}\cdot\mathrm{d}\vec{\ell} = -\frac{\partial\Phi_B}{\partial t}$	Faradays lov	$\vec{\nabla}\times\vec{E} = -\frac{\partial\vec{B}}{\partial t}$,

statikk dynamikk