Elektromagnetism MN1 - Viktiga samband.
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1 Kapitel 21

$\mathbf{F} = k\frac{q_1 q_2}{r^2}\hat{r} \quad k = \frac{1}{4\pi\epsilon_0}$ Coulumbs lag.

$\mathbf{E} = \frac{\mathbf{F}}{q_0} \quad \mathbf{E} = k\frac{q}{r^2}\hat{r}$

$\tau = (qE)(d * \sin\ \phi)$ Vridmoment

$\tau = p * E \sin\phi$

$\tau = \mathbf{p} \times \mathbf{E}$

$p = qd$

$U = -\mathbf{p} \cdot \mathbf{E}$ Potentiell energi i elektrisk dipol

2 Kapitel 22

$$\Phi_E = \oint E\cos\phi dA = \oint E_\perp dA = \oint \mathbf{E} \cdot d\mathbf{A} = \frac{Q_{inne}}{\epsilon_0} \qquad \text{Gauss Lag}$$

3 Kapitel 23

$W = U_1 - U_2 = -(U_2 - U_1) = -\Delta U$ Arbete

$W = F \cdot d = q_0 E d$

$U = k\frac{q_1 q_2}{r}$ Potentiell energi

$V = \frac{U}{q_0} \quad U = q_0 \cdot V \quad V = k\frac{q}{r} \quad V = k\int \frac{dq}{r}$ Elektrisk potential

4 Kapitel 24

$$C = \frac{Q}{V} = \epsilon_0 \frac{A}{d} \qquad \text{Kapacitans}$$

$$E = \frac{\sigma}{\epsilon_0} \quad V = Ed = \frac{1}{\epsilon_0}\frac{Qd}{A}$$

$$\frac{1}{C_{tot}} = \frac{1}{C_1} - \frac{1}{C_2} - \frac{1}{C_3}... \qquad \text{Serie}$$

$$C_{tot} = C_1 + C_2 + C_3... \qquad \text{Parallell}$$

$$U = \frac{Q^2}{2C} = \frac{1}{2}CV^2 = \frac{1}{2}QV \quad U = \frac{1}{2}\epsilon_0 E^2$$

$$C = kC_0 = k\epsilon_0 \frac{A}{d} = \epsilon \frac{A}{d}$$

$$\oint k\mathbf{E} \cdot d\mathbf{A} = \frac{Q_{inne}}{\epsilon_0}$$

5 Kapitel 25

$$I = \frac{dQ}{dt} = nq \cdot v_d A \quad \mathbf{J} = nq\mathbf{v}_d$$

$$\rho = \frac{E}{J}$$

$$U = R \cdot I \quad R = \frac{\rho L}{A}$$

$$IR = V_{ab} = emk \text{ (Ideal)} \quad V_{ab} = \ emk - Ir \qquad \text{(Inre resistans)}$$

$$P = VI = I^2R = \frac{V^2}{R} \quad P = emk * I - I^2 r \qquad \text{Effekt}$$

6 Kapitel 26

$$\frac{1}{R_{tot}} = \frac{1}{R_1} - \frac{1}{R_2} - \frac{1}{R_3}... \qquad \text{Parallell}$$

$$R_{tot} = R_1 + R_2 + R_3... \qquad \text{Serie}$$

7 Kapitel 27

$\mathbf{F} = q\mathbf{v} \times \mathbf{B}$

$\Phi_B = \int B_\perp dA = \int B\cos\phi \; dA = \int \mathbf{B} \cdot d\mathbf{A}$

$\oint \mathbf{B} \cdot d\mathbf{A} = 0$ Gauss lag för magnetiska fält.

$R = \dfrac{mv}{|q|B} \quad \omega = \dfrac{v}{R} = v\dfrac{|q|B}{mv} = \dfrac{|q|B}{m}$ Cirkelrörelse

$\mathbf{F} = I\mathbf{l} \times \mathbf{B} \quad d\mathbf{F} = Id\mathbf{l} \times \mathbf{B}$

$\tau = IBA\sin\phi \quad \tau = \mu \times \mathbf{B} \quad \mu = IA$

$U = \mu \cdot \mathbf{B}$ Potentiell energi

$nq = -\dfrac{J_x B_y}{E_z}$ Hall effekt

8 Kapitel 28

$\mathbf{B} = \dfrac{\mu_0}{4\pi}\dfrac{q\mathbf{v} \times \hat{\mathbf{r}}}{r^2}$

$\mathbf{B} = \dfrac{\mu_0 I}{2\pi r}$ Lång rak ledare

$\dfrac{F}{L} = \dfrac{\mu_0 I_1 I_2}{2\pi r}$

$B = \dfrac{\mu_0}{4\pi}\dfrac{2NIA}{r^3}$ På axeln, kort spole

$\oint \mathbf{B} \cdot d\mathbf{l} = \mu_0 I_{inne}$ Amperes Lag