MAGNETNO POLJE

F=I(l×B)=FIl sinφ

$$R_{el} = \frac{\xi l}{S}$$

$$\overline{P} = U_g I_g \cos\varphi$$

Magnetna sila in tokovi na vodnike

$F_m = Bev$ magnetna sila

$R = \frac{mv}{eB}$ polmer krožnega loka

$I = e_0 NSv$ tok v vodniku

$j = \frac{I}{S} = e_0 Nv$ gostota el. toka

$F = IdB$ vodnik pravokoten na silnice

$F = IdB\sin\varphi$ vodnik pod kotom

$E_h = vB$ Hallovo el. polje

$U_h = E_h d = vBd = \frac{jBd}{eN}$ Hallova napetost

Navor magnetne sile

$M = ISB\sin\varphi$ navor na ravno zanko

$M = nISB\sin\varphi$ navor na tuljavo

$p_m = nIS$ magnetni moment tuljave

Gostota magnetnega polja

$B = \mu_0 \frac{I}{2r}$ v zanki

$B = \mu_0 I \frac{n}{b}$ znotraj dolge tuljave

$B = \mu_0 \frac{I}{2\pi r}$ okoli ravnega vodnika

$F = \frac{\mu_0 r I_1 I_2}{2\pi d}$ med vzpor. vodnikoma

$B = \mu B_0$ μ - permeabilnost snovi

$$B_{snov} = B_{notr} + B_{zun}$$

$$B_{snov} = \mu \cdot B_{zun}$$

$$\mu_0 = \frac{1}{\varepsilon_0 c^2} = 4\pi \cdot 10^{-7} = 1{,}25 \cdot 10^{-6}$$

$$\varepsilon_0 = 9{,}8 \cdot 10^{-12} \frac{As}{Vm}$$

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

$B = \mu_0 H$ H jakost magn. polja

$H = \frac{I}{2\pi r}$ ravna žica

$B = \left[\frac{Vs}{m^2}\right]$ H=[A/m] [C]=[As]

$\mu_0 = \left[\frac{Vs}{Am}\right]$ $L = \left[\frac{Vs}{A}\right]$ $j = \left[\frac{W}{m^2}\right]$

$T = \left[\frac{N}{Am}\right] = \left[\frac{Vs}{m^2}\right]$ E=[V/m]

[J]=[VAs]

$B_{zemlja} = 5 * 10^{-5}$ T

$\mu_{železo} = 1000$

$S_{krogla} = 4\pi R^2$

Magnetni pretok, induktivnost

$\phi = BS\cos\varphi$

$\phi = NBS$ L induktivnost

$\phi = LI$

$L = \mu\mu_0 \frac{N^2 S}{l}$

$nI = H_š d + H_ž (b-d)$ torus navitje

$F = e(v \times B) = evB\sin\varphi$ sila an nabit delec v magnetnem polju

$r = \frac{mv}{eB}$ r krožnice po kateri se giblje nabit delec v homogenem B

$$\nu = \frac{\omega}{2\pi} = \frac{N}{t} = \frac{1}{t_0}$$

$$\omega = 2\pi\nu = \frac{2\pi}{t_0}$$

$\nu = \frac{\nu_0}{\sqrt{\varepsilon\mu}}$ sprememba nihajne frekvence

$$\omega = \frac{1}{\sqrt{LC}}$$

$$t_0 = 2\pi\sqrt{LC}$$

INDUKCIJA

$U_i = \frac{\Delta\phi_m}{\Delta t}$

$U_i = Blv$ pri premikanju vodnika

$W_m = \frac{LI^2}{2}$

$w_m = \frac{B^2}{2\mu_0}$

$W_e = \frac{CU^2}{2}$

$w_m = \frac{\mu_0 H^2}{2} = \frac{B^2}{2\mu_0}$

$$\frac{U_2}{U_1} = \frac{n_2}{n_1}$$

$$\frac{I_2}{I_1} = \frac{n_1}{n_2}$$

VALOVANJE NA VPETI VRVI:

$\mu = \frac{m}{b} = \rho S$ masa na enoto vrvi

$c = \sqrt{\frac{F}{\mu}} = \sqrt{\frac{F}{\rho S}}$ vrv

$c = \sqrt{\frac{kRT}{M}}$; $k = \frac{c_p}{c_v}$ plini

$c = \sqrt{\frac{E}{\rho}}$ trdna snov

$c = \sqrt{\frac{1}{\chi\rho}}$ kapljevine

$c = \lambda\nu$ hitrost valovanja

$\lambda_1 = 2b$ valovna dolžina

$\nu_n = n\nu_1 = n\frac{c}{2b}$ višjeharmonične frekv.

$\nu = (N+1)\frac{c}{2l}$ struna

ZVOK IN AKUSTIKA:

$\chi = \frac{\Delta V}{\Delta p V} = \frac{1}{E}$ stisljivost snovi

$$\frac{\Delta V}{V} = \beta\Delta T = \frac{-\Delta p}{p}$$

$c = \frac{1}{\sqrt{\rho\chi}}$ hitrost zvoka v kapljevini

$c = \sqrt{\frac{E}{\rho}}$ hitrost zvoka v kovini

$c = c_0\sqrt{\frac{T}{T_0}}$ hitrost zvoka v plinih

$P = \frac{\Delta W}{\Delta t}$ zvočni energijski tok

$j = \frac{\rho y_0^2 \omega^2 Sc}{2}$ zvočni energijski tok

$j = \frac{P}{S} = \frac{\Delta p_0^2}{2\rho c}$ gostota zvočnega toka

$j = \frac{\rho y_0^2 \omega^2 c}{2}$ gostota zvočnega toka

$j = \frac{P}{4\pi r^2}$ kroglasto širjenje zvoka, toplote(štefan)...

$$w = \frac{W}{V}$$

Doplerjev pojav:

$\nu = \nu_0$ sprejemnik in izvor mirujeta

$\nu = \nu_0\left(1 + \frac{v}{c}\right)$ sprejemnik pribl. izvoru

$\nu = \nu_0\left(1 - \frac{v}{c}\right)$ sprej. se odd. od izvora

$\nu = \frac{\nu_0}{1 - \frac{v}{c}}$ izvor pribl/v steno

$\nu = \frac{\nu_0}{1 + \frac{v}{c}}$ izvor odd./od stene

$\nu = \frac{\nu_0}{1 - 2\frac{v}{c}}$ radar

$M = \frac{v}{c}$ machova hitrost

$\sin\alpha = \frac{c}{v} = \frac{1}{M}$ odprtina mach. stožca

$\sin\frac{\alpha}{2} = \frac{c}{v}$ površinski udarni val

$t = t_0(1 - \frac{v}{c})$ izvor pribl.sprejemniku

$\nu_b = \frac{\nu_2 - \nu_1}{2}$

Interferenca zvokov:

$r_1 - r_2 = N\lambda$ ojačitve

$r_1 - r_2 = \frac{(2N+1)\lambda}{2}$ oslabitve

$d\sin\alpha_1 = \lambda$ ojačitev v smeri kota α_1

$d\sin\alpha_1' = \frac{\lambda}{2}$ oslabitev v smeri kota α_1'

$J = 10 \cdot \log_{10}\frac{j}{j_0}$ glasnost

$j_0 = 10^{-12}\frac{W}{m^2}$

P=jS

$j = j_0 \cdot 10^{\frac{J}{10}}$

$j_2 = j_1 \cdot e^{-\mu x}$ absorpcija

$J_1 = J_0 - 10\mu x \log e$

$x = \frac{J_1 - J_2}{10\mu \log e}$

ELEKTROMAGN. VALOVANJE:

$c = \lambda\nu$

$E = E_0 \sin(\omega t)$ jakost el. komponente val.

$B = B_0 \sin(\omega t)$ gostota magn.komponente

$E = cB$ (jakost el. polja

$P = \frac{\Delta W}{\Delta t}$ energijski tok

$P = c\varepsilon_0 E^2 S$ energijski tok

$j = \frac{P}{S} = c\varepsilon_0 E^2$ gostota energ. toka

$j = c^2\varepsilon_0 EB = \frac{EB}{\mu_0}$ gostota energ. toka

$\bar{j} = \frac{E_0 B_0}{2\mu_0} = \frac{c\varepsilon_0 E_0^2}{2}$ povprečna gost. toka

$\bar{j} = \frac{\bar{P}}{4\pi r^2} = \frac{c\varepsilon_0 E_0^2}{2}$ kroglasto valovanje

$P = \sigma S T^4$ Stefanov zakon za črne ploskve

$\sigma = 5{,}67 \cdot 10^{-8} Wm^{-2}K^{-4}$

$j_{sonce-zemlja} = 1\frac{kW}{m^2}$

$j_{sonce-vesolje} = 1{,}3\frac{kW}{m^2}$

$j = \frac{P}{S}$

Razmerje med B in E:

$\frac{B}{E} = \sqrt{\varepsilon_0\mu_0} = \frac{1}{c}$

Wienov Zakon:

$\lambda_{MAX} T = konst. = 0{,}290 cmK$

Lom svetlobe:

$\frac{\sin\alpha_1}{\sin\alpha_2} = \frac{\lambda_1}{\lambda_2} = \frac{c_1}{c_2} = \frac{n_2}{n_1}$ ali

$n_1 \sin\alpha_1 = n_2 \sin\alpha_2$

$\sin\alpha_m = \frac{c_1}{c_2}$ mejni kot

$n = \frac{c_1}{c_2}$

Popolni odboj:

$\sin\alpha_t = \frac{n_2}{n_1}$ mejni kot popol. odboja

Uklon svetlobe:

$D\sin\alpha_N = N\lambda$ ojačitev ; N–red ojač.

Uklonska ,rezica:

$D\sin\alpha_1 = \lambda$ določimo val. dolžino sv.

$y = y_0 \sin(\omega t - kx)$

$y = y_0 \sin\omega(t - \frac{x}{c})$

$\Delta\varphi = \frac{\omega\Delta x}{c}$

$c = \sqrt{\frac{kTR}{M}}$

$k = \frac{2\pi}{\lambda}$

T_0=273K

c_0=331m/s

$\frac{c_0^2}{c_1^2} = \frac{T_0}{T_1}$

zrak:
k=1,4
R=8300
M=29

normalni pogoji = 273K

voda

$n_2 = \frac{4}{3}$