Stojno valovanje
$c = \lambda\nu = \sqrt{\frac{F}{\rho S}} = \sqrt{\frac{Fl}{m}}; \qquad \nu = \frac{C}{\lambda}$

1. Struna, oba konca zaprta:
   $\lambda_1 = 2l; \quad \lambda_2 = l; \quad \lambda_3 = \frac{2l}{3}; \quad \lambda_n = \frac{2l;}{n}$
   $\nu_1 = \frac{c}{2l}; \quad \nu_2 = \frac{c}{l} = 2\nu; \quad \nu_3 = 3\nu_3;$
2. Struna, en konec zaprt:
   $\lambda_1 = 4l; \quad \lambda_2 = \frac{4l}{3}; \quad \lambda_3 = \frac{4l}{5}; \quad \lambda_n = \frac{4l}{2n-1};$
3. Struna, oba konca odprta:
   $\lambda_1 = 2l; \quad \lambda_2 = \frac{3l}{2}; \quad \lambda_3 = \frac{2l}{3}; \quad \lambda_n = \frac{2l}{n};$

Če iščeš 3. harmonsko frekvenco potem je n=4, če iščeš 1. višjo frekvenco je potem n=2!

ZVOK
$c = \nu\lambda; \quad F = c^2\rho S; \quad j = \frac{P}{S} = \frac{P}{4\pi r^2} = cW = \frac{1}{2}c\rho y_0^2\omega^2 = [\frac{W}{m^2}];$
$g = 10db * \log_{10}\frac{j}{j_0} = [db] \qquad j_0 = 10^{-12}\frac{W}{m^2}$

Interferneca:
a= oddaljenost
OJAČITEV: $a\sin\beta = N\lambda$
OSLABITEV: $a\sin\beta = (N+\frac{1}{2})\lambda$
Dopplerjev pojav:
$1. O \rightarrow\leftarrow P; \quad \nu^1 = \nu\frac{1+\frac{v_p}{c}}{1-\frac{v_o}{c}}$
$2. \leftarrow O\, P \rightarrow; \quad \nu^1 = \nu\frac{1-\frac{v_p}{c}}{1+\frac{v_o}{c}}$
$3. O \rightarrow P \rightarrow; \quad \nu^1 = \nu\frac{1-\frac{\nu_p}{c}}{1-\frac{\nu_o}{c}}$
$4. \leftarrow O \leftarrow P; \quad \nu^1 = \nu\frac{1+\frac{v_p}{c}}{1+\frac{v_o}{c}}$

LASERSKA SVETLOBA
mrežica $\tan\beta \approx \sin\beta; \quad a\tan\beta = N\lambda; \quad$ a$\frac{y}{x} = N\lambda$
$[a = \frac{1}{n} \;\; a\sin\beta_1 = \lambda \;\Rightarrow \beta_1 \quad N_{max} = \lfloor a\sin 90^\circ \rfloor \Rightarrow \sin\beta_{max} = \frac{N_{max}\lambda}{a}]$

ABSORPCIJA
$j = j_{za\check{c}}e^{-\mu x}$

STEFANOV ZAKON
$j = \frac{P}{s} = (\frac{P}{4\pi r^2}) = \sigma T^4; \quad \sigma = 5,67 * 10^{-8}\frac{W}{m^2K^4}; \qquad [j = \sigma T^4_{sonca}(\frac{R_{sonca}}{r})^2]$

WIENOV ZAKON
$\lambda = \frac{k_w}{T}; \quad k_w = 2,9 * 10^{-3}mK$ C,e=toplotna kapaciteta

$\frac{W}{t} = P = \sigma T^4 4\pi r^2(e); \quad [Q = t{*}P; \; Q = C{*}\Delta T; \; Q = Q \;\; \Delta T = t\sigma T^4 4\pi r^2 e]$

$U = \frac{dI}{d\lambda} = \frac{2\pi hc}{\lambda^5} * \frac{1}{e^{\frac{hc}{k_b T\lambda}}}$

FOTOEFEKT

$c = 3 * 10^8 \frac{m}{s}$

$E_f = h\nu = h\frac{c}{\lambda}$ $p_f = \frac{h}{\lambda} = \frac{E_f}{c} = \left[\frac{mkg}{s}\right] gibalna\, količina$ $A_i = h\nu = izstopno\, delo$ $W_k = E_f - A_i - e_o * U$

Zaporna napetost:

$U_{zap} = \frac{E_f - A_i}{e_o}$

pulzi:

$P = E_f * n$

POTUJOČE VALOVANJE:

$\Psi(x,t) = A\sin(\omega t - kx) \rightarrow$ $A = \omega^2 y = amplituda$

$\Psi(x,t) = A\sin(\omega t + kx) \leftarrow$

$\frac{1}{c^2}\frac{\partial^2\Psi}{\partial t^2} = \frac{\partial^2\Psi}{\partial x^2}$

Ψ= Ψ(x,t) je amplituda, mera jakosti valovanja v določeni točki x v času t. Za zvočno valovanje v zraku je s krajevni zračni tlak, za nihajočo struno je s premik strune od svoje mirovne lege.

$y = y_o \sin(\omega t - kx)$ $\omega = \frac{2\pi}{t_o} = [s^{-1}]$ $k = \frac{2\pi}{\lambda} = \frac{2\pi\nu}{c} = \frac{\omega}{c} = [m^1]$ $v = \frac{dy}{dt} = v_o \cos\Phi$ $w = \frac{W}{V} = \frac{1}{2}\rho x_0^2 \omega^2$ $j = wc = \frac{1}{2}\rho ... \uparrow$

PREČNO-TRANSVERZALNO VALOVANJE:

$\mu = \frac{m}{l} = [\frac{kg}{m}] = lin.\, gostota$

$c = \sqrt{\frac{F}{\mu}}$ $\epsilon_0[\frac{Vm}{As}]$ $\mu_0[\frac{Am}{Vs}]$

HITROSTI

valovanja zvoka v

plinih:

$c = \sqrt{\frac{\chi RT}{M}} = \sqrt{\frac{p}{\chi\rho}}$ $R = 8,3144\frac{J}{molK}$

trdnih snoveh:

$c = \sqrt{\frac{E}{\rho}}$ $E = prož.\, modul...$

tekočinah:

$c = \sqrt{\frac{B}{\rho}}$ $B = stis.\, modul...$

valovanja EM

$c = \sqrt{\frac{1}{\epsilon_0\mu_0}}$

valovanja svetlobe

$c = \frac{c_o}{\sqrt{\epsilon_0\mu_0}} = \frac{c_0}{n}$ $n = lom.\, količnik$