

1.

가

$$p(x,t)$$

$$\frac{\partial^2 p}{\partial x^2} - \frac{1}{c^2} \frac{\partial^2 p}{\partial t^2} = 0$$

$$(x=L)$$

$$(x=0)$$

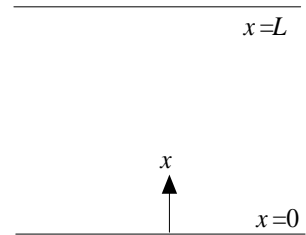
가

가

$$p(0,t) = P_0 \cos \omega t$$

(standing wave)

$$p(x,t)$$



2.

(a)

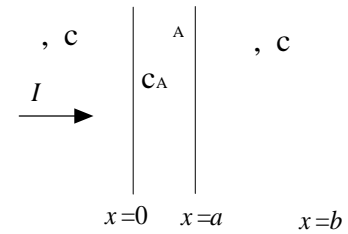
가 가

(x=0)

$$(\sigma_x)_i = f(t - \frac{x}{c})$$

$$(\dot{u})_i = -\frac{1}{\rho c} f(t - \frac{x}{c})$$

x=b



3.

(, Lamé

, G)

(axial shear motion)

$$w(r,z,t)$$



(a)

가

(b)

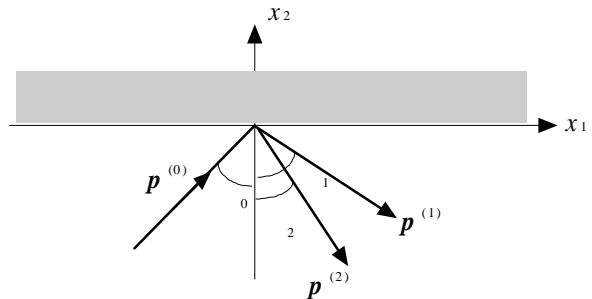
1. (12) SV 가 $x_2 < 0$

가, $x_2 = 0$

. $x_2 > 0$

(rigid)

$x_2 = 0$



(a) $x_2 = 0$

$$A_0 (-\cos \theta_0 \mathbf{i}_1 + \sin \theta_0 \mathbf{i}_2) \exp[i k_0 (x_1 \sin \theta_0 + x_2 \cos \theta_0 - c_T t)]$$

$$\mathbf{u}^{(0)} =$$

$$\mathbf{u}^{(1)}, \mathbf{u}^{(2)} = A_1, k_1, \theta_1, A_2, k_2, \theta_2$$

(b) $x_2 < 0$

$$\mathbf{u}^{(1)}, \mathbf{u}^{(2)}$$

\mathbf{u}

$$\mathbf{u}^{(0)}$$

$$k_1, \theta_1, k_2, \theta_2$$

(c)

$$\frac{A_1}{A_0} = \frac{A_2}{A_0}$$

(d) $\theta_0 = 0$

()

2. (12)

(,)

G)

(torsional wave)가

,

$$v(r, z, t)$$

(free)

(a)

가

$$\frac{\partial \tau_{r\theta}}{\partial r} + \frac{2}{r} \tau_{r\theta} + \frac{\partial \tau_{\theta z}}{\partial z} = \rho \frac{\partial^2 v}{\partial t^2}$$

(b)

$$\exp[i(kz - \omega t)]$$

$$R(r)$$

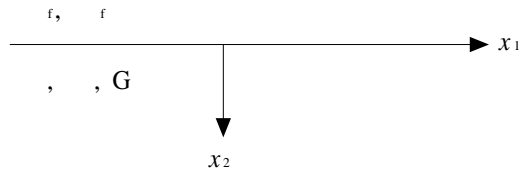
$$v(r, z, t) = R(r)$$

(c) $k = \omega / c_T$,

phase velocity

(d) $k = \omega / c_T$,

phase velocity



(a) Rayleigh (x_1, x_2, t) (x_1, x_2, t)
 c_T Lamé c_L

(b) $f(x_1, x_2, t)$
 c_T

(c) $(x_1, x_2, t) = (x_2) \exp[i(kx_1 - t)]$
 $(x_1, x_2, t) = (x_2) \exp[i(kx_1 - t)]$
 $f(x_1, x_2, t) = f(x_2) \exp[i(kx_1 - t)]$

$$k^2 - \frac{\omega^2}{c_L^2} = p^2, \quad k^2 - \frac{\omega^2}{c_T^2} = q^2, \quad \frac{\omega^2}{c_f^2} - k^2 = s^2$$

* $= A \exp(-px_2), \quad = B \exp(-qx_2),$

$f = C \exp(-isx_2)$

(d) $x_2=0$

(e) $u_2, u_2^f, \quad 2, \quad 2^f, \quad 21, \quad , \quad , \quad f$
 $, (*)$

(f) (e)

(g) (f) 0 $?$

$$4 k^2 p q - (k^2 + q^2)^2 = ?$$

(h) wavenumber k $(k_R + i k_I)$