$$\frac{c_f}{b} = \left\{ \frac{1}{2} \left[s^2 + 1 + \sqrt{(s^2+1)^2 - 4s^2\cos^2\theta} \right] \right\}^{1/2}$$

$$\frac{c_s}{b} = \left\{ \frac{1}{2} \left[s^2 + 1 - \sqrt{(s^2+1)^2 - 4s^2\cos^2\theta} \right] \right\}^{1/2}$$

$$\frac{b_n}{b} = |\cos\theta|$$

$\theta = 0$

$$n^2 = R \qquad R = 1 - \frac{\omega_p^2}{\omega^2} \cdot \frac{\omega}{\omega + \Omega}$$

$$\vec{n} = \frac{c}{\omega}\vec{k}$$

$$\left(\frac{kc}{\omega}\right)^2 = 1 - \frac{\omega_p^2}{\omega}\frac{1}{\omega+\Omega}$$

$$(kc)^2 = \omega^2 - \frac{\omega_p^2\,\omega}{(\omega+\Omega)}$$

$$\left(\frac{kc}{\Omega}\right)^2 = \left(\frac{\omega}{\Omega}\right)^2 - \frac{\omega_p^2\,\omega}{\Omega^2(\omega+\Omega)}$$

$$= \left(\frac{\omega}{\Omega}\right)^2 - \left(\frac{\omega_p}{\Omega}\right)^2 \frac{\frac{\omega}{\Omega}}{\left(\frac{\omega}{\Omega}+1\right)}$$

$$y = x^2 - k\frac{x}{x+1}$$