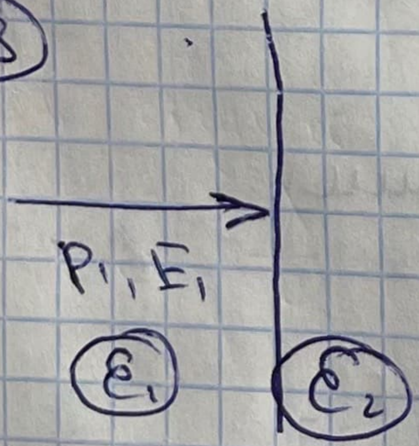
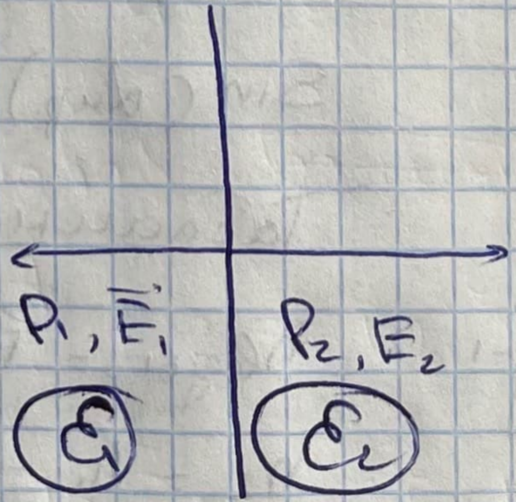
2.8



$\Rightarrow$



$R = \dfrac{P_1'}{P_1} = \dfrac{1}{2}$

$\varepsilon_1, \varepsilon_2 - ?$

$P = S\Sigma, \quad S = c\varepsilon\varepsilon_0 E^2$

$$\frac{P_1'}{P_1} = \frac{S_1'}{S_1} = \frac{E_1'^2}{E_1^2} \Rightarrow \frac{E_1'}{E_1} = \sqrt{R}$$

В случае норм. падения $\vec{E}$ содержит лишь тангенс. компонент

$$\Rightarrow \begin{cases} E_1 + E_1' = E_{21} \\ H_1 - H_1' = H_{21} \end{cases} \overset{E = ZH}{\Longleftrightarrow} \begin{cases} E_1 + E_1' = E_2 \\ \dfrac{E_1}{Z_1} - \dfrac{E_1'}{Z_1} = \dfrac{E_2}{Z_2} \end{cases} \Longleftrightarrow \begin{cases} \dfrac{E_1 + E_1'}{Z_2} = \dfrac{E_2}{Z_2} \\ \dfrac{E_1 - E_1'}{Z_1} = \dfrac{E_2}{Z_2} \end{cases}$$

$$\Rightarrow \frac{E_1 + E_1'}{Z_2} - \frac{E_1 - E_1'}{Z_1} = 0, \quad (Z_1 - Z_2)E_1 = -(Z_1 + Z_2)E_1'$$

$$\frac{E_1'}{E_1} = \frac{Z_2 - Z_1}{Z_2 + Z_1}$$

$$\sqrt{R} = \frac{Z_2 - Z_1}{Z_2 + Z_1} \Rightarrow Z_1(1 + \sqrt{R}) = Z_2(1 - \sqrt{R}),$$

$$Z_1^2 = Z_2^2 \left(\frac{1 - \sqrt{R}}{1 + \sqrt{R}}\right)^2, \quad Z = \sqrt{\frac{\mu_0 \mu}{\varepsilon_0 \varepsilon}}$$

$$\Rightarrow \frac{\mu_1}{\varepsilon_1} = \frac{\mu_2}{\varepsilon_2}\left(\frac{1 - \sqrt{R}}{1 + \sqrt{R}}\right)^2, \quad \varepsilon_1 = \frac{\varepsilon_2 \mu_1}{\mu_2}\left(\frac{1 + \sqrt{R}}{1 - \sqrt{R}}\right)^2$$

$$\varepsilon_1 = \frac{\mu_1}{\mu_2}\varepsilon_2\left(\frac{1 + \frac{1}{\sqrt{2}}}{1 - \frac{1}{\sqrt{2}}}\right)^2 = \frac{\mu_1}{\mu_2}\left(\frac{\sqrt{2} + 1}{\sqrt{2} - 1}\right)^2 = \frac{\mu_1}{\mu_2}\varepsilon_2(\sqrt{2} + 1) \approx 33{,}97\frac{\mu_1}{\mu_2}\varepsilon_2$$

Ответ: ε_1 и ε_2 : $\dfrac{\varepsilon_1}{\varepsilon_2} = 33{,}57\,\dfrac{\mu_2}{\mu_1}$