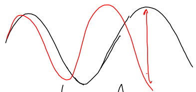

$\lambda = \frac{c}{f}$ | $c = \frac{1}{\sqrt{\mu_r \varepsilon_r}} c_0$

$\left(n+\frac{1}{2}\right)\frac{c}{f} = n\frac{c_0}{f} \Rightarrow n = \frac{1}{2\left(\sqrt{\mu_r \varepsilon_r}-1\right)}$

$\lambda = \frac{1}{2\left(\sqrt{\mu_r \varepsilon_r}-1\right)} \frac{c_0}{f} \approx 2{,}87\,mm$

feb 5-11:19

a) $\underline{Z} = \sqrt{\frac{\omega \cdot \mu}{2\sigma}}(1+j) = 27{,}4(1+i)\,\Omega$

$\left(\frac{\sigma}{\omega\varepsilon}\right)^2 = \frac{19}{2\pi \cdot 1{,}9 \cdot 10^9 \cdot 10^{-12} \cdot 8{,}}$

$= 1000 \gg 1$

b) $H = \frac{E}{Z} = 0{,}027(1-i)\,T$

c) $P = \frac{1}{2} \cdot E \cdot H \cdot A = 0{,}027(1-i)\,W$

d) $t = \frac{d}{v} = 86\,ns$

e) $E = E_0 \cdot e^{-\frac{z}{\delta}} \Rightarrow z = -\delta \ln\left(\frac{E_0}{E}\right) = 5{,}9(1-i)\,mm$

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A 3.3

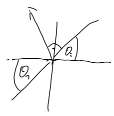
$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\theta_2 = 90^\circ - \theta_1$

$\frac{n_1}{n_2} = \frac{\sin(90^\circ - \theta_1)}{\sin\theta_1}$

$= \cot\theta_1$

$\Rightarrow \theta_1 = \arctan\left(\frac{n_2}{n_1}\right)$



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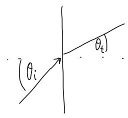
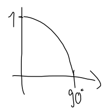
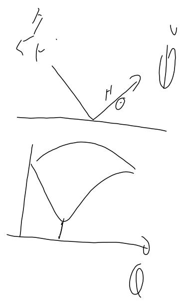


$\theta_t < \theta_i$

$\cos(\theta_t)$





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