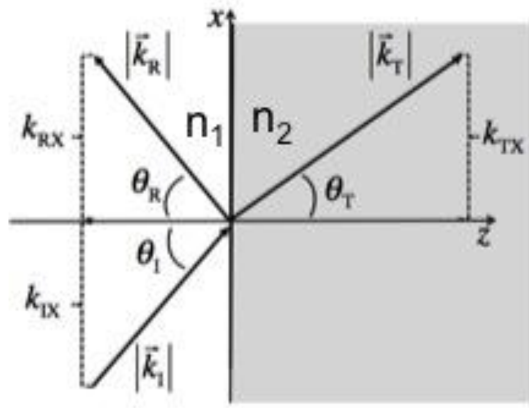
In Eq 9.104, why is there a minus sign in front of the 2nd term on the left side, why doesn't it add? (Aren't we superposing incoming and reflected waves?)

In section 9.3.3, Griffiths derives Snell's law ($n_1/n_2 = \sin\theta_T / \sin\theta_I$).



With polarization unspecified, which one of the following boundary conditions is needed to derive Snell's law ?

$E_1^{//}=E_2^{//}$

$\epsilon_1 E_1^{\perp}=\epsilon_2 E_2^{\perp}$

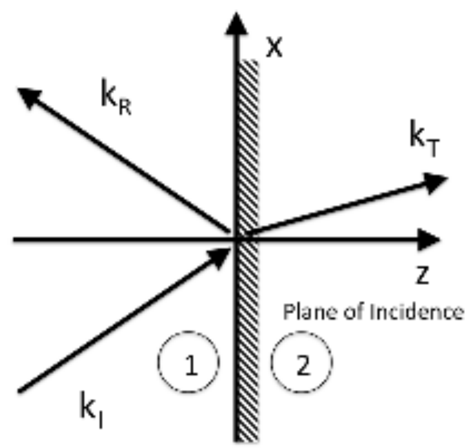
$B_1^{\perp}=B_2^{\perp}$

$B_1^{//}/\mu_1=B_2^{//}/\mu_2$

It's hard to pick, because in general ANY of these can be used!

(Please elaborate)

Griffiths section 9.3.3 is all about EM waves striking a surface at "oblique" incidence. That means the incoming wave is hitting the medium (like from air into glass) at an angle, NOT head on... Later in the section, he will make an assumption that the "polarization of the incident wave is parallel to the plane of incidence". What exactly does that MEAN?



Using the axis choices of Fig 9.14 (reproduced above) choose all the statements (and ONLY the statements) that are equivalent to the statement "polarization of the incident wave is parallel to the plane of incidence"

(Important : some of the statements might happen to be true (!) but have nothing to do with that statement! If so, do not pick them...!)

The incident E field lies in (or parallel to) the xz plane.
The incident E field lies in (or parallel to) the xy plane
The incident E field lies in (or parallel to) the yz plane
The incident E field is parallel to the x axis
The incident E field is parallel to the y axis
The incident E field is parallel to the z axis
The incident wave vector lies in (or parallel to) the xz plane
The incident wave vector lies in (or parallel to) the xy plane
The incident wave vector lies in (or parallel to) the yz plane
I think it's none of these - it means something very different?!

(Please elaborate)

(continued)

In Griffiths 9.3.2, he drew E_I and E_R with arrows pointing up (as shown in Figure 9.13). He defines $\tilde{\mathbf{E}}_I(z,t) = \tilde{E}_{0_I} e^{i(k_1 z - \omega t)}\,\hat{\mathbf{x}},$ and $\tilde{\mathbf{E}}_R(z,t) = \tilde{E}_{0_R} e^{i(-k_1 z - \omega t)}\,\hat{\mathbf{x}},$. Griffiths then derives $\tilde{E}_{0_R} = \left(\frac{1-\beta}{1+\beta}\right)\tilde{E}_{0_I},$ (equation 9.82) with ß=v_1/v_2 When using the boundary condition $E_1^{//} = E_2^{//}$, we need to first evaluate just the left side, that is, the parallel component of the *full* electric field in medium 1, $\tilde{\mathbf{E}}_1^{//}$

Which one of the following two expressions for this is correct?

Watch out, the "1" subscript which appears on the left side of those equations looks kind of similar to the capital I "I" (for incident) subscript which appears on the right side... So to be clear: the left side of the equations below refers to subscript "1", it's the total (parallel component of) the E field in medium 1. The right sides below are a combination of "I" (incident) and "R" (reflected) terms. We simply want to know whether they add or subtract, when you combine them to find the total field...

For this question, assume we are in the special case ß>1

$$\tilde{\mathbf{E}}_1^{//} = \tilde{\mathbf{E}}_I^{//} + \tilde{\mathbf{E}}_R^{//}$$

$$\tilde{\mathbf{E}}_1^{//} = \tilde{\mathbf{E}}_I^{//} - \tilde{\mathbf{E}}_R^{//}$$

Given that we are assuming ß>1, when taking the x component of the above vector equation, *which of the following is correct?*

$$\tilde{E}_1 = \tilde{E}_{0I} + \tilde{E}_{0R}$$

$$\tilde{E}_1 = \tilde{E}_{0I} - \tilde{E}_{0R}$$

Briefly explain your reasoning for the previous two questions.