

PHYS 333 — Problem Set #21

Reading: Ch. 9.1 – 9.2 (you may skip 9.1.3)

Problems: Due before you start the take-home exam.

1. Griffiths 9.1
2. Griffiths 9.2
3. Griffiths 9.9
4. In class on Monday we will briefly discuss standing-wave solutions of the wave equation for electromagnetic fields between two mirrors perpendicular to the z -axis located at $z = 0$ and $z = L$. Here are the complete results:

$$\begin{aligned}\mathbf{E} &= E_0 \sin\left(\frac{n\pi z}{L}\right) \cos\left(\frac{cn\pi t}{L}\right) \hat{\mathbf{x}} \\ \mathbf{B} &= -\frac{E_0}{c} \cos\left(\frac{n\pi z}{L}\right) \sin\left(\frac{cn\pi t}{L}\right) \hat{\mathbf{y}}\end{aligned}$$

Prove that these fields satisfy all four of Maxwell's equations, and the wave equations for electric and magnetic fields.