Quiz #1

Friday, September 1

PHYSICS 851, FALL 2000

1. Consider the matrix:

$$\mathcal{M} = \begin{pmatrix} 4 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{pmatrix}$$

   (a) What are the eigenvalues of $\mathcal{M}$?

   (b) What are the eigenvectors of $\mathcal{M}$?

2. An RCP photon, $|R\rangle = (|x\rangle + i|y\rangle)/\sqrt{2}$, enters a special crystal with indices of refraction: n_x for photons polarized along the x axis and n_y for photons polarized along the y axis. The wavelength of the light is λ before it enters the crystal along the z axis. Choose the thickness of the crystal z such that the outgoing light is LCP, $|L\rangle = (|x\rangle - i|y\rangle)/\sqrt{2}$. Assume the dispersion is linear, $k = n\omega/c$.