

**Problem 1.** ( $\approx$  Jackson 7.1a)

Assume a wave has Stokes parameters  $s_0 = 5$ ,  $s_1 = -1$ ,  $s_2 = 4$ ,  $s_3 = -2^{3/2}$ .

- Deduce the amplitude of the electric field, up to an overall phase, in linear polarization bases.
- Make an accurate drawing similar to Figure 7.4 showing the lengths of the axes of the ellipse and its orientation.
- Find  $a_1$ ,  $a_2$ , and  $\delta_1 - \delta_2$ .
- Is the wave right- or left-elliptically polarized?

**Problem 2.**

A medium that has index of refraction  $n = 2$  and  $\epsilon = \epsilon_0$  (but  $\mu \neq \mu_0$ ) is used as a polarizer.

- At what angle(s)  $i$  should we shine light on that medium (from a vacuum) in order to get completely polarized light out?
- What is the direction of polarization of the polarized light?
- What is the efficiency of the polarizer? (In other words, if an unpolarized light beam with energy flux  $S$  shines on the surface at the proper angle, what is the energy flux of the polarized light produced, expressed as a fraction of the incident flux  $S$ ?)

