Practice Problems Related to Polarization

1. Suppose that you have defined axes $\hat{\mathbf{x}}$ and $\hat{\mathbf{y}}$ so that the electric field as a function of time is

$$\mathbf{E} = \hat{\mathbf{x}}\mathcal{E}_x \cos(\omega t - \phi_x) + \hat{\mathbf{y}}\mathcal{E}_y \cos(\omega t - \phi_y) \ . \tag{1}$$

You compute the Stokes parameters I, Q, U, and V for a monochromatic wave. Now you look at the same monochromatic wave with a different set of axes that are the original axes rotated by an angle ψ counterclockwise. What do you get when you compute I, Q, U, and V with respect to these new axes?