10.35 Determine the wave polarization of each of the following waves:

(a) $E_o \cos(\omega t + \beta y)\mathbf{a}_x + E_o \sin(\omega t + \beta y)\mathbf{a}_z$ V/m

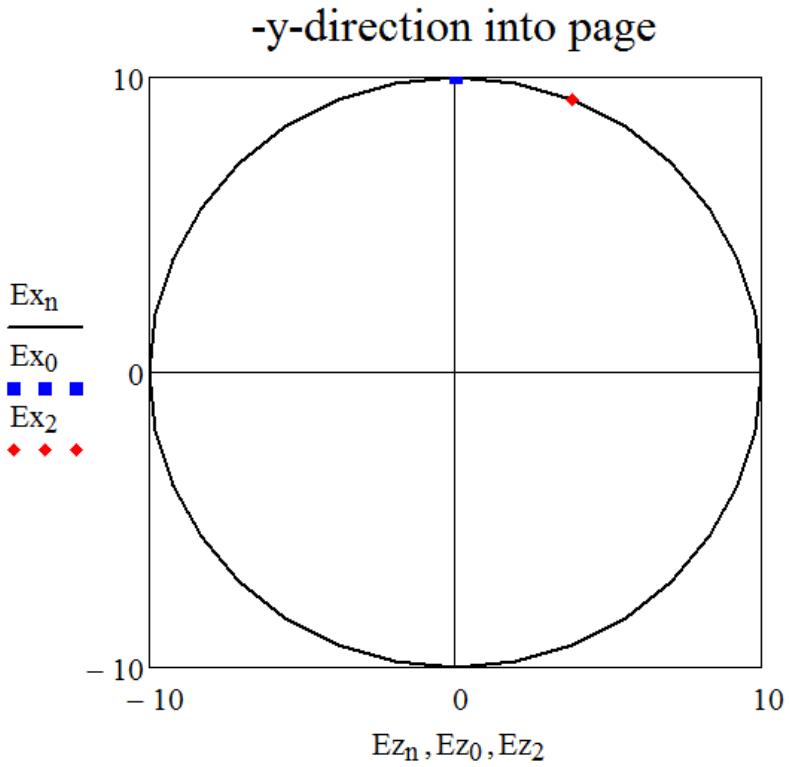
- Also, plot the polarization ellipse with axes selected so that the wave propagates into the page. Determine the sense, AR, and tilt angle τ with respect to the vertical axis. Let E_0 = 10 V/m for plot.

Observe components have the same amplitude and that the cos() function and sin() function are 90° out-of-phase ⇒ **Circular polarization**.

Use MathCad to plot polarization ellipse-

Plot the polarization ellipse for a circularly-polarized UPW propagating in the -*y*-direction (+βy term)) on the $y = 0$ plane. Let E0=10 V/m.

$n := 0 .. 32 \qquad wt_n := n\frac{\pi}{16} \qquad Ex_n := 10\cos(wt_n) \quad Ez_n := 10\cdot\sin(wt_n) \quad V/m$



From plot, the **sense** of the polarization ellipse is **RH/righthand or CW/clockwise**.

For circular polarization, the **axial ratio AR = 1**.

For circular polarization, the tilt angle τ with respect to the vertical axis is **τ = N/A**.