Quiz 2 Answers

Find the instantaneous time sinusoidal functions corresponding to the following phasors. \((z \text{ is position. } Y_0^+ \text{ and } Y_0^- \text{ are real and positive})\)

\[
\tilde{Y}_1(z) = Y_0^+ e^{-j\beta z} \quad \quad y_1(z, t) = Y_0^+ \cos(\omega t - \beta z)
\]

\[
\tilde{Y}_2(z) = Y_0^- e^{j\beta z} \quad \quad y_2(z, t) = Y_0^- \cos(\omega t + \beta z)
\]

\[
\tilde{Y}(z) = -2jY_0^+ \sin(\beta z)
\]

\[
y(z, t) = \Re[-2jY_0^+ \sin(\beta z)e^{j\omega t}] = 2Y_0^+ \sin(\beta z)\sin(\omega t)
\]

\[
= 2Y_0^+[\cos(\omega t - \beta z) - \cos(\omega t + \beta z)]
\]

Find the phasor for the following function of position \(z\) and time \(t\). \((z \text{ is position. } V_0^+ \text{ is real and positive})\)

\[
v(z, t) = 2V_0^+ \cos(\beta z)\cos(\omega t)
\]

\[
\tilde{V}(z) = 2V_0^+ \cos(\beta z)
\]

Some students did one more step using the Euler identity. That’s fine.

Grading guidelines:

- Attendance points 60. Each problem 10 points.
- Full points for alternative correct answers, e.g. \(\cos(x-\pi/2) = \sin x\)
- Deduct 1 point for equating phasor to time function or vice versa (having a phasor on one side of an equation and a function of \(z\) and \(t\) on the other side).