

Problem 2.25

Given $z(t) = Ze^{j2\pi t}$ where $Z = e^{j\frac{\pi}{4}}$

$$(a) \frac{dz(t)}{dt} = Ze^{j2\pi t} j2\pi$$

From the derivative of $z(t)$ it is seen that $Q = Z(j2\pi) = e^{j\frac{\pi}{4}}(j2\pi) = e^{j\frac{3\pi}{4}}(2\pi)$.

Note : j is expressed as $e^{j\frac{\pi}{2}}$

(b) Hence, angle of Q is greater than angle of Z by $\frac{\pi}{2}$ radians.

Phasor Plot with Z and Q :

