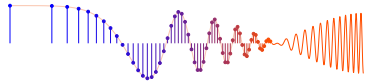


PROBLEM:

Simplify the following and give the answer in polar form. Make a plot of all the vectors involved in the complex addition.

(a) $z_a = e^{-j5\pi/3} + 2e^{j5\pi/6}$

(b) $z_b = \sqrt{2}e^{j(\pi/4)} + \sqrt{2}e^{-j(\pi/4)} - 1$

(c) In addition, write the MATLAB statements that will perform the addition and also display the magnitude and phase of the result. Consult `help` on the MATLAB functions `abs` and `angle`, and also the SP-First Toolbox functions: `zprint`, `zvect`, etc. Use these to check your hand calculations.

McClellan, Schafer and Yoder, *Signal Processing First*, ISBN 0-13-065562-7.
Prentice Hall, Upper Saddle River, NJ 07458.

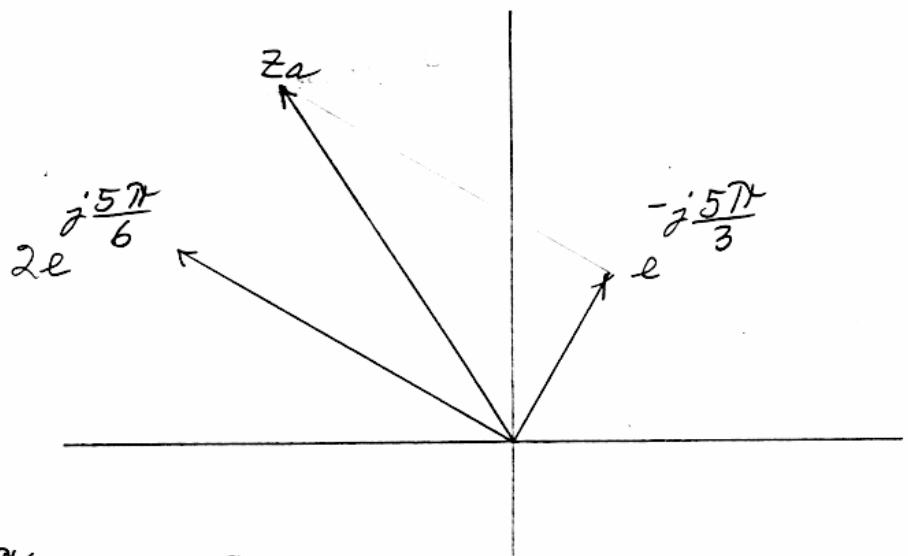
SOLUTION

(a) $z_a = e^{-j\frac{5\pi}{3}} + 2e^{j\frac{5\pi}{6}}$

$z_a = 0.5 + j\sqrt{3}/2 + 2(-\sqrt{3}/2 + j0.5)$

$= 0.5 + j\sqrt{3}/2 - \sqrt{3} + j1 = -1.23 + j1.87$

$= 2.24e^{j2.15}$



(b) $z_b = \sqrt{2}e^{j\pi/4} + \sqrt{2}e^{-j\pi/4} - 1 = 1 + j1 + 1 - j1 - 1 = 1$