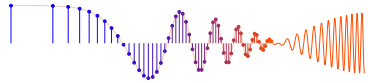


PROBLEM:

Given a feedback filter defined via the recursion:

$$y[n] = 0.9\,y[n-4] + x[n-2] \qquad \text{(DIFFERENCE EQUATION)} \qquad (1)$$

(a) Find the z-transform operator representation for the system in (1).

(b) Find the poles of the system and plot their location in the z-plane.

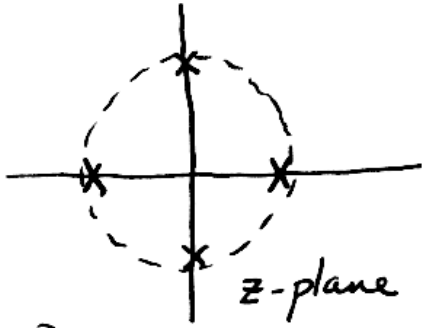
McClellan, Schafer and Yoder, *Signal Processing First*, ISBN 0-13-065562-7.
Prentice Hall, Upper Saddle River, NJ 07458.

SOLUTION

(a) $H(z) = \dfrac{z^{-2}}{1 - 0.9z^{-4}}$

(b) Find roots of: $1 - 0.9z^{-4} = 0$

$\Rightarrow z^4 = 0.9e^{j2\pi\ell}$



$$\text{POLES} = \left\{ \sqrt[4]{0.9}e^{j\pi/2}, \sqrt[4]{0.9}e^{j\pi}, \sqrt[4]{0.9}e^{j3\pi/2}, \sqrt[4]{0.9} \right\}$$

value = 0.974