Example 10-14: The following H(z) has two poles and two zeros.

$$H(z) = \frac{2 + 2z^{-1}}{1 - z^{-1} + z^{-2}} = 2\frac{z^2 + z}{z^2 - z + 1}$$

The system function can be written in factored form as either of the two forms

$$H(z) = \frac{2z(z+1)}{(z-e^{j\pi/3})(z-e^{-j\pi/3})}$$

$$= \frac{2(1+z^{-1})}{(1-e^{j\pi/3}z^{-1})(1-e^{-j\pi/3}z^{-1})}$$
(10.9a)
(10.9b)

In the form (10.9a), it is easy to see that the poles $\{p_1, p_2\}$ and zeros $\{z_1, z_2\}$ are

$$p_{1} = \frac{1}{2} + j\frac{1}{2}\sqrt{3} = e^{j\pi/3}$$

$$p_{2} = \frac{1}{2} - j\frac{1}{2}\sqrt{3} = e^{-j\pi/3}$$

$$z_{1} = 0$$

$$z_{2} = -1$$

The poles and zeros are plotted in Fig. ??.

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