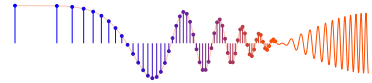

PROBLEM:

For each $H(z)$, determine all of the poles and zeroes, including those at $z = 0$ and $z = \infty$.

System Function, $H(z)$

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

ANS =

(b) $H(z) = \dfrac{1}{1 - 2z^{-1}}$

ANS =

(c) $H(z) = \dfrac{1}{z + 2}$

ANS =

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

ANS =

Poles and Zeros

1. pole at $z = -2$, zero at $z = \infty$.
2. pole at $z = -2$, zero at $z = 0$.
3. pole at $z = -2$, zero at $z = 1$.
4. pole at $z = 2$, zero at $z = 1$.
5. pole at $z = 2$, zero at $z = 0$.
6. pole at $z = 0$, zero at $z = 2$.
7. pole at $z = \frac{1}{2}$, zero at $z = 0$.
8. pole at $z = \frac{1}{2}$, zero at $z = \infty$.

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SOLUTION

For each $H(z)$, determine all of the poles and zeroes, including those at $z = 0$ and $z = \infty$.

System Function, $H(z)$

(a) $H(z) = \dfrac{1}{1 - \frac{1}{2}z^{-1}} = \dfrac{z}{z - 1/2}$

ANS = 7

(b) $H(z) = \dfrac{1}{1 - 2z^{-1}} = \dfrac{z}{z - 2}$

ANS = 5

(c) $H(z) = \dfrac{1}{z + 2}$ $\lim_{z \to \infty} H(z) = 0$

ANS = 1

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

ANS = 3

Poles and Zeros

1. pole at $z = -2$, zero at $z = \infty$.
2. pole at $z = -2$, zero at $z = 0$.
3. pole at $z = -2$, zero at $z = 1$.
4. pole at $z = 2$, zero at $z = 1$.
5. pole at $z = 2$, zero at $z = 0$.
6. pole at $z = 0$, zero at $z = 2$.
7. pole at $z = \frac{1}{2}$, zero at $z = 0$.
8. pole at $z = \frac{1}{2}$, zero at $z = \infty$.

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