

PROBLEM:

A linear time-invariant system is described by the difference equation

$$y[n] = x[n] + x[n - 4]$$

- Find its impulse response $h[n]$.
- Find its system function $H(z)$.
- Plot the poles and zeros of $H(z)$ in the z -plane.
(Recall that $-1 = e^{j\pi k}$ where k is an *odd* integer.)
- Find the frequency response $H(e^{j\hat{\omega}})$ and express it in polar form (magnitude and phase).
- Carefully sketch and label a plot of $|H(e^{j\hat{\omega}})|$ for $-\pi < \hat{\omega} < \pi$.