

PROBLEM:

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

$$y[n] = \frac{1}{4} (x[n] + x[n - 1] + x[n - 2] + x[n - 3])$$

- Find its system function $H(z)$.
- Plot the poles and zeros of $H(z)$ in the z -plane.
- Find the frequency response $H(e^{j\hat{\omega}})$, express it in polar form (magnitude and phase), and plot the magnitude and phase of $H(e^{j\hat{\omega}})$ as a function of $\hat{\omega}$ for $-\pi < \hat{\omega} < \pi$.