

PROBLEM:

Suppose that a system is defined by the following operator

$$\hat{H}(z) = (1 - e^{j\pi/4}z^{-1})(1 - e^{-j\pi/4}z^{-1})(1 + z^{-2})$$

- Write the time-domain description of this system—in the form of a difference equation.
- If the input to this system is an impulse $x[n] = \delta[n]$, determine the impulse response $h[n]$ for $n \geq 0$.
- Derive simple formulas for the magnitude of the frequency response $|H(e^{j\hat{\omega}})|$ versus $\hat{\omega}$, and the phase response versus $\hat{\omega}$. These formulas must contain no complex terms and no square roots.