

PROBLEM:

Suppose that a system is defined by the following operator

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

- Write the time-domain description of this system—in the form of a difference equation.
- Derive a simple formula for the “magnitude squared” of the frequency response $|H(e^{j\hat{\omega}})|^2$ versus $\hat{\omega}$. This formula must contain no complex terms and no square roots.
- Is this system a lowpass or highpass filter? EXPLAIN