

PROBLEM:

We now have four ways of describing an LTI system: the difference equation; the impulse response, $h[n]$; the frequency response, $H(e^{j\hat{\omega}})$; and the system function, $H(z)$. In the following, you are given one of these representations and you must find the other three.

(a) $y[n] = (x[n] + 2x[n - 2] + x[n - 4]).$

(b) $h[n] = \delta[n] + \delta[n - 1] + \delta[n - 2] + \delta[n - 3] + \delta[n - 4].$

(c) $H(e^{j\hat{\omega}}) = [1 + \cos(2\hat{\omega})]e^{-j\hat{\omega}3}.$ *Hint: Expand the cosine using Euler's formula.*

(d) $H(z) = 1 - 2z^{-2} + z^{-4} + z^{-7}.$