

## PROBLEM:

We now have four ways of describing an LTI system: the difference equation with filter coefficients  $\{b_k\}$ ; 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 system function  $H(z)$ .

(a)  $y[n] = 3(x[n] - x[n - 3]).$

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

(c)  $H(e^{j\hat{\omega}}) = [2j \sin(2\hat{\omega})]e^{-j3\hat{\omega}}.$

(d)  $h[n] = \delta[n] + \delta[n - 3].$