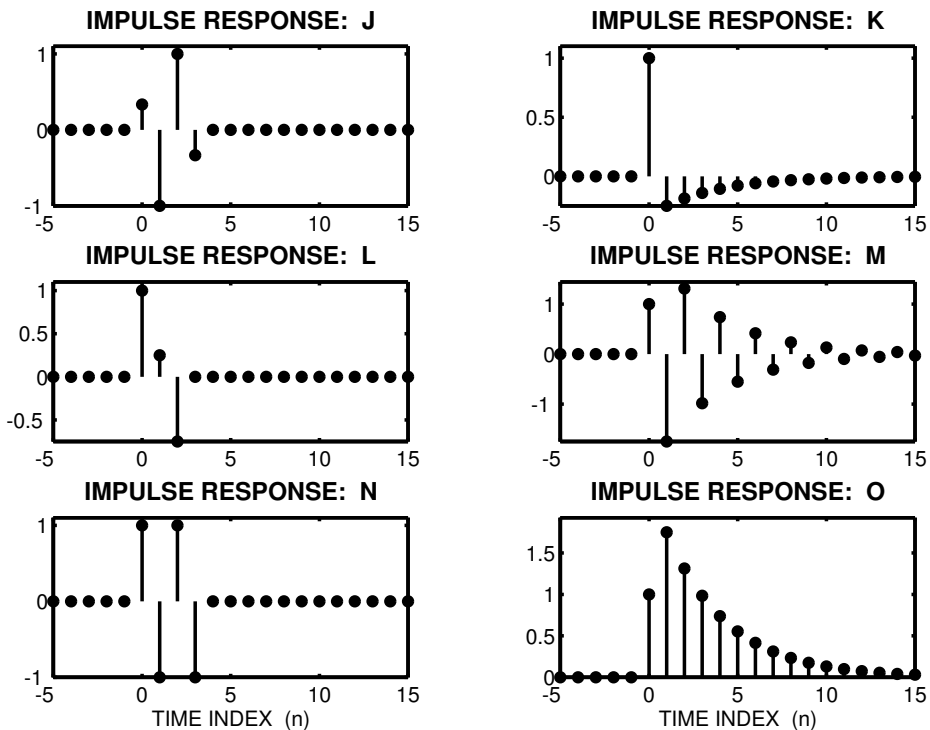


**PROBLEM:**

For each of the impulse-response plots (J, K, L, M, N, O), determine which one of the following systems (specified by either an  $H(z)$  or a difference equation) matches the impulse response. In addition, derive a formula for the impulse response,  $h[n]$ , for  $\mathcal{S}_1$  and  $\mathcal{S}_4$ .

$$\mathcal{S}_1: \quad y[n] = 0.4y[n-1] + x[n] + x[n-1]$$

$$\mathcal{S}_2: \quad H(z) = \frac{1 + z^{-1}}{1 - 0.75z^{-1}}$$

$$\mathcal{S}_3: \quad y[n] = -0.75y[n-1] + x[n] - x[n-1]$$

$$\mathcal{S}_4: \quad H(z) = \frac{1 - z^{-1}}{1 - 0.75z^{-1}}$$

$$\mathcal{S}_5: \quad y[n] = x[n] - x[n-1] + x[n-2]$$

$$\mathcal{S}_6: \quad H(z) = 1 - z^{-1} + z^{-2} - z^{-3}$$

$$\mathcal{S}_7: \quad y[n] = x[n] + \frac{1}{4}x[n-1] - \frac{3}{4}x[n-2]$$

$$\mathcal{S}_8: \quad H(z) = \frac{1}{3}(1 - z^{-1})^3$$