

2.19 A discrete-time system is given by the following input/output difference equation:

$$y[n+2] + 0.75y[n+1] + 0.125y[n] = x[n]$$

(b) Compute $y[n]$ for $n = 0, 1, 2, 3$ when $y[-2] = y[-1] = 0$, and $x[n] = 1$ for $n \geq -2$.

➤ Do problem manually. [Hint: Exploit time-invariance to re-index I/O difference equation.]

Use Time-invariance to re-index the I/O difference eqn, i.e., $n \rightarrow n-2$

$$y[n] + 0.75y[n-1] + 0.125y[n-2] = x[n-2]$$

$$\underline{y[n] = -0.75y[n-1] - 0.125y[n-2] + x[n-2]}$$

$$n=0 \quad y[0] = -0.75y[-1] - 0.125y[-2] + x[-2] = \underline{\underline{1}}$$

$$n=1 \quad y[1] = -0.75y[0] - 0.125y[-1] + x[-1] = \underline{\underline{0.25}}$$

$$n=2 \quad y[2] = -0.75y[1] - 0.125y[0] + x[0] = \underline{\underline{0.6875}}$$

$$n=3 \quad y[3] = -0.75y[2] - 0.125y[1] + x[1] = \underline{\underline{0.453125}}$$

