PROBLEM:

A linear time-invariant discrete-time system is described by the difference equation

$$y[n] = x[n] - 2x[n-1] + 3x[n-2] - 4x[n-3] + 2x[n-4].$$

(a) Draw a block diagram that represents this system in terms of unit-delay elements, coefficient multipliers, and adders as in Figure 5.13 in the *SP First.*

(b) Determine the impulse response $h[n]$ for this system.

(c) Use convolution to determine the output due to the input

$$x[n] = \delta[n] - \delta[n-1] + \delta[n-2] = \begin{cases} 1 & n = 0, 1, 2 \\ 0 & \text{otherwise} \end{cases}$$

Plot the output sequence $y[n]$ for $-3 \leq n \leq 10$.