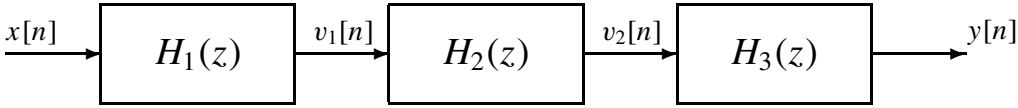
PROBLEM:

In the following cascade of systems, two of the individual transfer functions are known.



$$H_1(z) = \frac{4}{1 + \frac{1}{2}z^{-1}} \qquad H_2(z) = 2 + 3z^{-1} + z^{-2}$$

(a) Find the first output $v_1[n]$ when the input signal $x[n]$ is an impulse, i.e., $x[n] = \delta[n]$. Give a general formula for $n \geq 0$.

(b) Determine the output of the middle system $v_2[n]$ when $x[n] = \delta[n]$. Give a plot or formula.

(c) Determine $H_3(z)$ so that the output $y[n]$ will be identical to the input $x[n]$.