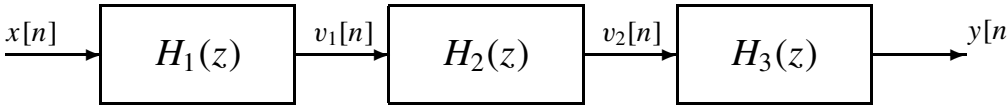
PROBLEM:

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



$$H_1(z) = \frac{4}{1 - \frac{1}{3}z^{-1}} \qquad H_2(z) = 1 - z^{-2} \qquad H_3(z) = 3 - 4z^{-1} + z^{-2}$$

(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 $H(z)$ the z-transform of the cascaded system. Simplify $H(z)$.

(c) Determine the output $y[n]$ when the input is $x[n] = \delta[n]$. Give a plot or formula.