$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) - \frac{1}{3}x(n-1)$$

$$Y(z) - \frac{3}{4}\frac{Y(z)}{z} - \frac{1}{8}\frac{Y(z)}{z^2} = X(z) - \frac{1}{3}\frac{X(z)}{z}$$

$$Y(z)\left[1 - \frac{3}{4z} - \frac{1}{8z^2}\right] = X(z)\left[1 - \frac{1}{3z}\right]$$

$$\frac{Y(z)}{X(z)} = \frac{\left[1 - \frac{1}{3z}\right]}{\left[1 - \frac{3}{4z} - \frac{1}{8z^2}\right]}$$

$$= \frac{\left[1 - \frac{1}{3}z^{-1}\right]}{\left[1 - \frac{1}{2}z^{-1}\right]\left[1 - \frac{1}{4}z^{-2}\right]}$$

$$\frac{1}{1 - \frac{1}{3z}} = \frac{B}{(1 - \frac{1}{2}z^{-1})} + \frac{A}{\left[1 - \frac{1}{4}z^{-2}\right)}$$

$$\left[1 - \frac{1}{3z}\right] = B\left[1 - \frac{1}{4z^2}\right] + A\left[1 - \frac{1}{2}z^{-1}\right]$$

$z^2 = \frac{1}{4}$

$z = \pm \frac{1}{2}$

$z = -\frac{1}{2}$ //

$z = \frac{1}{2}$

$B = \frac{1}{3}$ //

$A\left[1 - \frac{2}{3} = A \cdot 2\right]$

$A = \frac{2}{3}$ //

$$H(z) = \frac{\left(\frac{1}{3}\right)}{\left[1 - \frac{1}{2}z^{-1}\right]} + \frac{\left(\frac{2}{3}\right)}{1 - \frac{1}{4}z^{-1}}$$