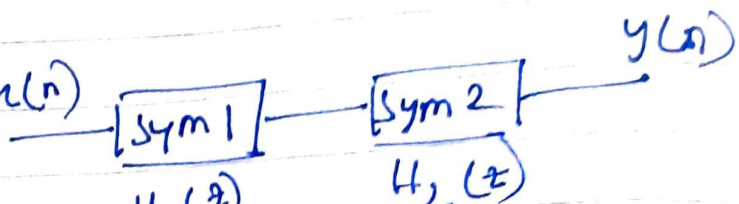
Question 7: Cascade realization of system function

$$H(z) = \underbrace{(1+2z^{-1}-z^{-2})}_{H_1(z)}\underbrace{(1+z^{-1}-z^{-2})}_{H_2(z)}$$

$$H_1(z) = 1+2z^{-1}-z^{-2}$$

$$\frac{Y_1(z)}{X_1(z)} = 1+2z^{-1}-z^{-2}$$



$$Y_1(z) = X_1(z) + 2z^{-1}X_1(z) - z^{-1}X_1(z)$$
$$y_1(n) = x_1(n) + 2x_1(n-1) - x_1(n-2)$$

$$H_2(z) = 1+z^{-1}-z^{-2}$$

$$\frac{Y_2(z)}{Y_2(z)} = 1+z^{-1}-z^{-2}$$

$$Y_2(z) = X_2(z) + z^{-1}X_2(z) + z^{-2}X_2(z)$$
$$y_2(n) = x_2(n) + x_2(n-1) - x_2(n-2)$$