

Question 4: Realize the filter described by difference eqn

$$y(n) = 0.5y(n-1) - 0.25y(n-2) + x(n) + 0.4x(n-1)$$

$$y(n) - 0.5y(n-1) + 0.25y(n-2) = x(n) + 0.4x(n-1)$$

$$Y(z) - 0.5z^{-1}Y(z) + 0.25z^{-2}Y(z) = X(z) + 0.4z^{-1}X(z)$$

$$\frac{Y(z)}{X(z)} = \frac{(1 + 0.4z^{-1})}{(1 - 0.5z^{-1} + 0.25z^{-2})}$$

[By taking inverse
z-transform on both
sides]