

Problem-4:

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

Taking z-transform

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

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

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

Realized model in direct form II;

