Yusuf H. Sahin

Q1: Depict the parallel-form representation of the system.

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

$$H(z) = \frac{1}{1 - \frac{1}{2}z^{-1}} + \frac{1}{1 + \frac{1}{2}z^{-1}} + \frac{2}{1 - \frac{1}{4}z^{-1}}$$

$$H_3(z) = \frac{Y_3(z)}{X_3(z)} \cdot \frac{A(z)}{A(z)}$$

$$Y_3(z) = 2 \cdot A(z)$$

$$A(z) = 1 \cdot X_3(z) - \left(-\frac{1}{4}\right)A(z)$$

$$H_1(z) = \frac{Y_1(z)}{X_1(z)} = \frac{1}{1 - \frac{1}{2}z^{-1}} \cdot \frac{A(z)}{A(z)}$$

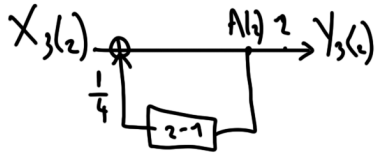
$$H_2(z) = \frac{Y_2(z)}{X_2(z)} = \frac{1}{1 + \frac{1}{2}z^{-1}} \cdot \frac{A(z)}{A(z)}$$

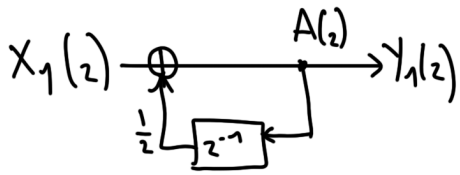
$$Y_1(z) = 1 \cdot A(z)$$

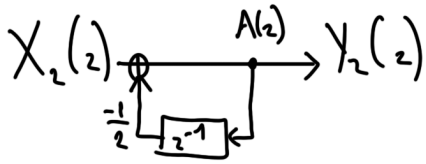
$$A(z) = 1 \cdot X_1(z) - \left(-\frac{1}{2}z^{-1}\right)A(z)$$

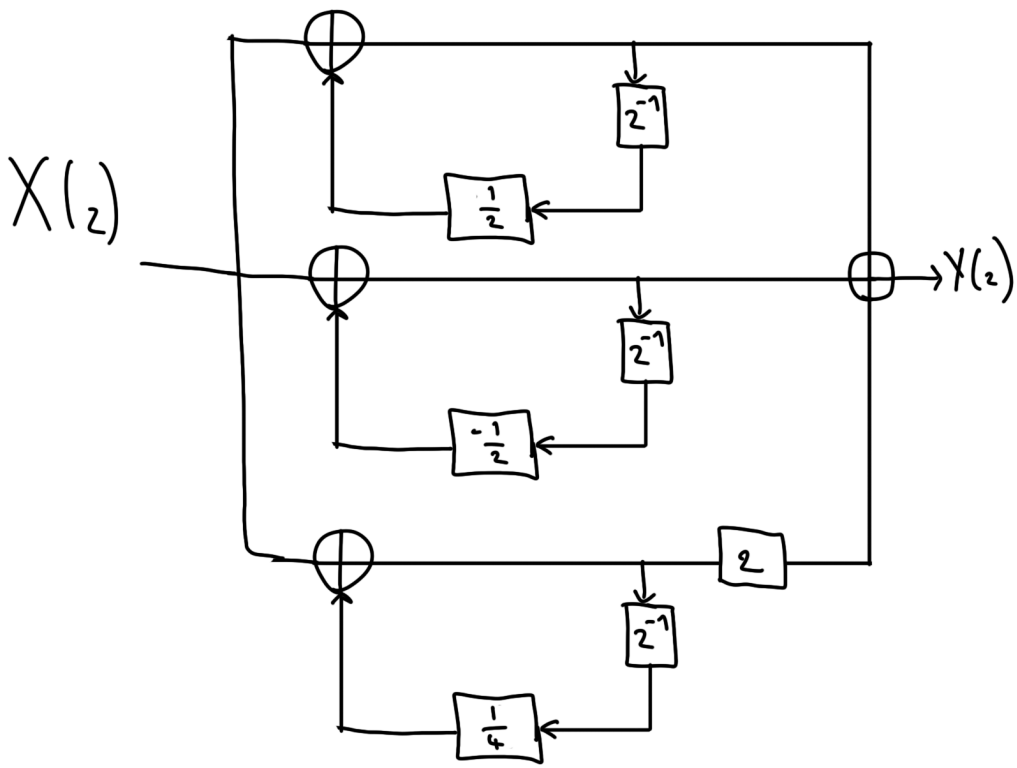
$$Y_2(z) = 1 \cdot A(z)$$

$$A(z) = 1 \cdot X_2(z) - \left(\frac{1}{2}z^{-1}\right)A(z)$$









Q2: Draw the block diagram for the following IIR filter.

$$H(z) = \frac{z^3 - 2z^2 + z}{z^3 - 0.1z^2 - 0.07z - 0.065}$$

$$H(z) = \frac{1 - 2z^{-1} + z^{-2}}{1 - 0,1z^{-1} - 0,007z^{-2} - 0,0065z^{-3}} \cdot \frac{A(z)}{A(z)} = \frac{Y(z)}{X(z)}$$

$$Y(z) = 1.\left(1 - 2z^{-1} + z^{-2}\right).A(z)$$

$$A(z) = 1.X(z) - \left(-0,1.z^{-1} - 0,007z^{-2} - 0,0065z^{-3}\right)A(z)$$