

$$A_{m-1}(z) = \frac{A_m(z) - K_m \cdot B_m(z)}{1 - K_m^2}$$

$$H(z) = \frac{C(z)}{A(z)} \quad \leftarrow \text{numerator}$$

$$A(z) \quad \leftarrow \text{denominator}$$

$$B_m(z) = z^{-m} \cdot A_m(z^{-1})$$

$$C_{m-1}(z) = C_m(z) - V_m \cdot B_m(z)$$

①

$$H(z) = \frac{1 + 2z^{-1} + 3z^{-2} + 2z^{-3}}{1 + \frac{2}{5}z^{-1} + \frac{7}{20}z^{-2} + \boxed{\frac{1}{2}}z^{-3}} = \frac{C_3(z)}{A_3(z)}$$

$$A_2(z) = \frac{1 + \frac{2}{5}z^{-1} + \frac{7}{20}z^{-2} + \frac{1}{2}z^{-3} - \frac{1}{2} \left(\frac{1}{2} + \frac{7}{20}z^{-1} + \frac{2}{5}z^{-2} + z^{-3} \right)}{1 - \left(\frac{1}{2}\right)^2}$$

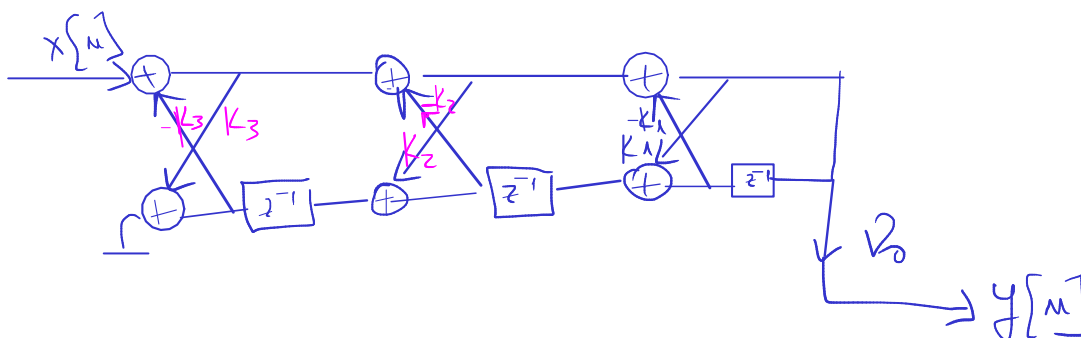
$$= \frac{1 - \frac{1}{4} + \left(\frac{2}{5} - \frac{7}{40}\right)z^{-1} + \left(\frac{7}{20} - \frac{2}{10}\right)z^{-2}}{1 - \frac{1}{4}} = \frac{\frac{3}{4} + \frac{9}{40}z^{-1} + \frac{3}{20}z^{-2}}{\frac{3}{4}}$$

$$= 1 + \frac{3}{10}z^{-1} + \boxed{\frac{1}{5}}z^{-2} \quad \text{last coef. of } A_m(z) \text{ is } K_m$$

$$A_1(z) = \frac{1 + \frac{3}{10}z^{-1} + \frac{1}{5}z^{-2} - \frac{1}{5} \left(\frac{1}{5} + \frac{3}{10}z^{-1} + z^{-2} \right)}{1 - \left(\frac{1}{5}\right)^2} = \frac{1 - \frac{1}{25} + z^{-1} \left(\frac{3}{10} - \frac{3}{50} \right)}{1 - \frac{1}{25}}$$

$$= \frac{\frac{24}{25} + \frac{12}{50}z^{-1}}{\frac{24}{25}} = 1 + \boxed{\frac{1}{4}}z^{-1} \quad K_1$$

② $H(z) = \frac{1}{1 + \frac{2}{5}z^{-1} + \frac{7}{20}z^{-2} + \frac{1}{2}z^{-3}} = \frac{\underline{C_0(z)} = \underline{v_0 = 1}}{A_3(z)}$



$$C_3(z) = 1 + 2z^{-1} + 3z^{-2} + \boxed{2}z^{-3} \quad \checkmark_3$$

$B_3(z) = \text{inverse of } A_3(z)$

$$C_2(z) = 1 + 2z^{-1} + 3z^{-2} + 2z^{-3} - 2 \cdot \left(\frac{1}{2} + \frac{7}{20}z^{-1} + \frac{2}{5}z^{-2} + z^{-3} \right)$$

$$= 1 - 1 + z^{-1} \left(2 - \frac{14}{20} \right) + z^{-2} \left(3 - \frac{4}{5} \right)$$

$$= \frac{6}{20}z^{-1} + \boxed{\frac{11}{5}}z^{-2} \quad \checkmark_2$$

$B_2(z) = \text{inverse of } A_2(z)$

Error in calculations

Please redo them to find the correct values

$$C_1(z) = \underbrace{2 \cdot \frac{6}{20}z^{-1} + \frac{11}{5}z^{-2}}_{C_2(z)} - \frac{11}{5} \left(\frac{1}{5} + \frac{3}{10}z^{-1} + z^{-2} \right)$$

$$= -\frac{11}{25} + z^{-1} \left(\frac{6}{20} - \frac{33}{50} \right)$$

$$\frac{30}{100} - \frac{66}{100} =$$

$$= -\frac{11}{25} + \boxed{\frac{-33}{100}}z^{-1} \quad \checkmark_1$$

$$C_0(z) = -\frac{11}{25} - \frac{33}{100}z^{-1} + \frac{33}{100} \cdot \left(\frac{1}{4} + z^{-1} \right)$$

$$= -\frac{11}{25} + \frac{33}{400} = \boxed{\frac{\dots}{\dots}} \quad \checkmark_0$$