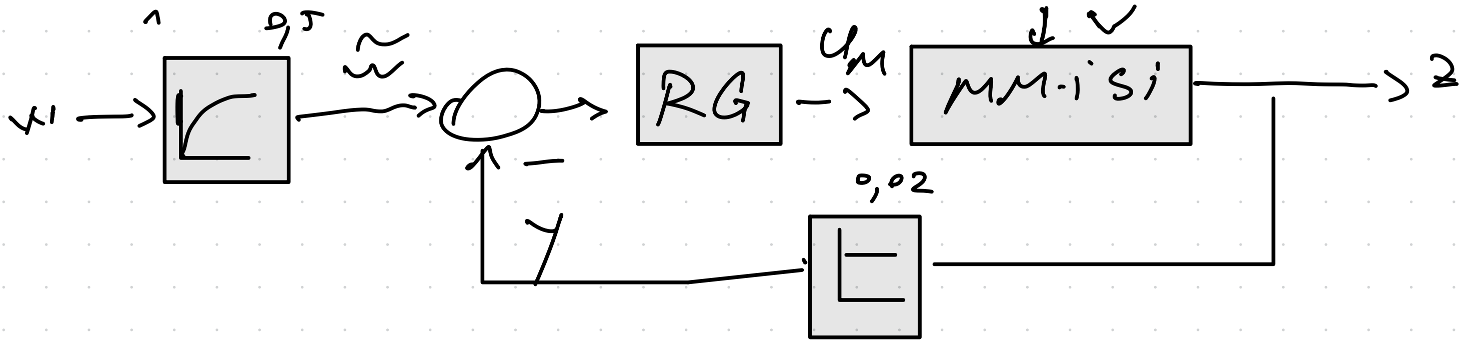

$$H(s) = \frac{Y(s)}{U(s)} \Rightarrow Y(s) = H(s) \cdot U(s)$$

$$m(s) = (10+15)\, u_M(s) \rightarrow m(t) = 25\, u_M(t)$$

$$e_2(s) = m(s) - Y_1(s) = 25\, u_M(s) - 0{,}8\, z(s)$$

$$Y_1(s) = 0{,}8 \cdot z(s)$$

$$n(s) = \frac{0{,}08}{0{,}05\, s + 1} \cdot e_2(s)$$

$$0{,}05\, s\, n(s) + n(s) = 0{,}08\, e_2(s) \rightarrow$$

$$0{,}05\, \dot{n}(t) = -n(t) + 0{,}08\, e_2(t)$$

$$\dot{n}(t) = -20\, n(t) + 1{,}6\, e_2(t)$$

$$= -20\, n(t) + 1{,}6 \left[25\, u_M(t) - 0{,}8\, z(t) \right]$$

$$= -20\, n(t) + 40\, u_M(t) - 1{,}28\, z(t)$$

$$e_1(s) = n(s) - v(s) \rightarrow e_1(t) = n(t) - v(t)$$

$$z(s) = \frac{1}{0{,}1\, s}\, e_1(s) \rightarrow s\, z(s) = 10\, e_1(s)$$

$$\dot{z}(t) = 10\, e_1(t) = 10\, n(t) - 10\, v(t)$$

$$\begin{bmatrix} \dot{n} \\ \dot{z} \end{bmatrix} = \begin{bmatrix} -20 & -1{,}28 \\ 10 & 0 \end{bmatrix} \begin{bmatrix} n \\ z \end{bmatrix} + \begin{bmatrix} 40 & 0 \\ 0 & -10 \end{bmatrix} \begin{bmatrix} u_M \\ v \end{bmatrix}$$

$$z \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} n \\ z \end{bmatrix}$$

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \underbrace{\begin{bmatrix} -2 & 2 \\ 0 & -0{,}5 \end{bmatrix}}_{A} \underbrace{\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}}_{\text{stati}} + \underbrace{\begin{bmatrix} 0 & 40 \\ 12{,}5 & 0 \end{bmatrix}}_{B} \underbrace{\begin{bmatrix} m \\ d \end{bmatrix}}_{\text{ingressi}}$$

$$Z = \underbrace{\begin{bmatrix} 1 & 0 \end{bmatrix}}_{C} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

$$H_{zm}(s) = \left.\frac{Z(s)}{m(s)}\right|_{d=0} \qquad H_{zd}(s) = \left.\frac{Z(s)}{d(s)}\right|_{m=0}$$

$$H(s) = C \underbrace{(sI - A)}_{M}^{-1} B = \begin{bmatrix} H_{zm}(s) & H_{zd}(s) \end{bmatrix}$$

$$M^{-1} = \frac{1}{\det(M)} M^{*}$$

$$M = \begin{bmatrix} s & 0 \\ 0 & s \end{bmatrix} - \begin{bmatrix} -2 & 2 \\ 0 & -0,5 \end{bmatrix} = \begin{bmatrix} s+2 & -2 \\ 0 & s+0,5 \end{bmatrix}$$

$$\det = (s+2)(s+0,5) = 2(1+0,5s)\cdot 0,5(1+2s)$$

$$= (1+0,5s)(1+2s) =$$

$$M^T = \begin{bmatrix} s+2 & 0 \\ -2 & s+0,5 \end{bmatrix} \qquad M^* = \begin{bmatrix} s+0,5 & 2 \\ 0 & s+2 \end{bmatrix}$$

$$M^{-1} = \frac{1}{\det M} \cdot M^*$$

$$H(s) = C \cdot \frac{1}{\det M} \cdot M^* \cdot B \Rightarrow$$

$$\begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} s+0,5 & 2 \\ 0 & s+2 \end{bmatrix} = \begin{bmatrix} s+0,5 & 2 \end{bmatrix}$$

$$\begin{bmatrix} s+0,5 & 2 \end{bmatrix} \begin{bmatrix} 0 & 40 \\ 12,5 & 0 \end{bmatrix} = \begin{bmatrix} 25 & 40s+20 \end{bmatrix}$$

$$H(s) = \frac{1}{\det} \rightsquigarrow \begin{bmatrix} \underbrace{\frac{25}{(1+0,5s)(1+2s)}}_{H_{zm}(s)} & \underbrace{\frac{20}{(1+0,5s)}}_{H_{zd}(s)} \end{bmatrix}$$

grad 2

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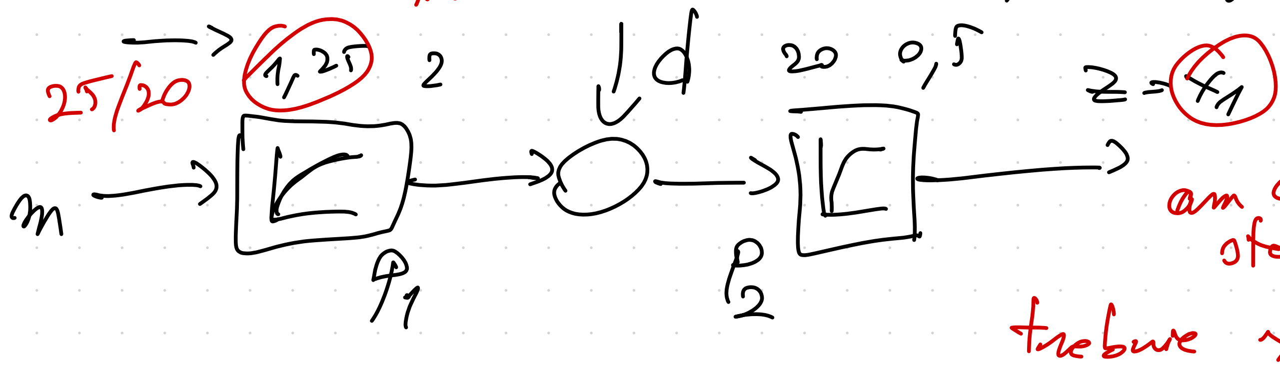


am doar starea x_1

trebuie x_2

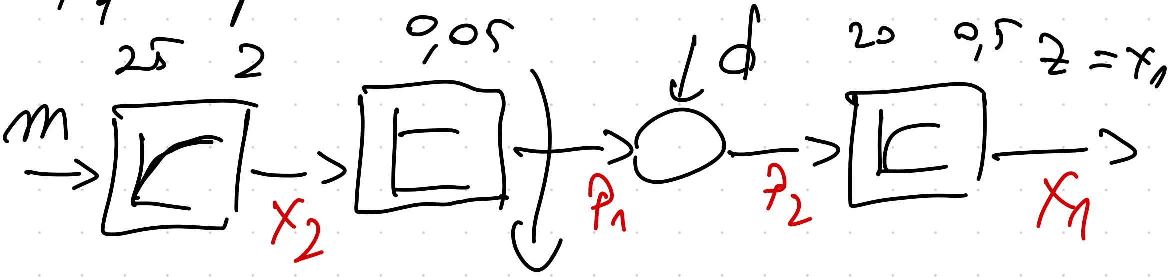
$$s\,x_2(s) = -0,5\,x_2(s) + 12,5\,m(s)$$

$$x_2(s)(s+0,5) = 12,5\,m(s)$$

$$0,5\,x_2(s)(1+2s) = 12,5\,m(s)$$

$$\to \frac{x_2(s)}{m(s)} = \frac{12,5}{0,5(1+2s)} = \frac{25}{1+2s}$$

P_1 separat în 2 blocuri



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