

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

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

$$e_2(s) = m(s) - Y_1(s) = 25 U_m(s) - 0,8 z(s)$$

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

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

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

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

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

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

$$= -20 n(t) + 40 U_m(t) - 1,28 z(t)$$

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

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

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

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

$$Z = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} m \\ z \end{bmatrix}$$

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

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

$$H_{Zm}(s) = \left. \frac{z(s)}{m(s)} \right|_{d=0}$$

$$H_{Zd}(s) = \left. \frac{z(s)}{d(s)} \right|_{m=0}$$

$$H(s) = C \underbrace{\left(sI - A \right)^{-1}}_M B = \begin{bmatrix} H_{Zm}(s) & H_{Zd}(s) \end{bmatrix}$$

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

$$M: \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \sim \begin{bmatrix} -2 & 2 \\ 0 & -0,5 \end{bmatrix} \sim \begin{bmatrix} 1+2 & -2 \\ 0 & 1+0,5 \end{bmatrix}$$

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

$$M^T = \begin{bmatrix} 1+2 & 0 \\ -2 & 1+0,5 \end{bmatrix} \quad M^* = \begin{bmatrix} 1+0,5 & 2 \\ 0 & 1+2 \end{bmatrix}$$

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

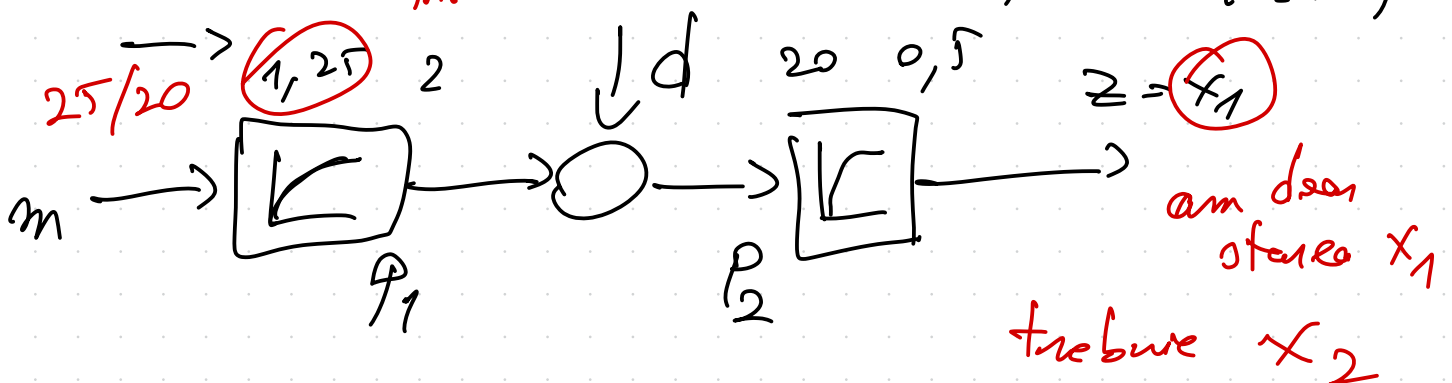
$$H(s) = C \cdot \frac{1}{\det M} \cdot M^* \cdot B \Rightarrow$$

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

$$\begin{bmatrix} 1+0,5 & 2 \end{bmatrix} \begin{bmatrix} 0 & 40 \\ 12,5 & 0 \end{bmatrix} = \begin{bmatrix} 25 & 40s+20 \end{bmatrix}$$

$$H(s) = \frac{1}{\det} \Rightarrow \left\{ \frac{25}{\underbrace{(1+0,5s)(1+2s)}_{H_{2m}(s)}} \quad \frac{20}{\underbrace{(1+0,5s)}_{H_{2d}(s)}} \right\}$$

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

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

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

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

P_1 separat în 2 blocuri

