

$$\ddot{y} + 3\dot{y} + 2y = 0 \quad \leftarrow \text{jednowadnie.}$$

$$x_1 = y$$

$$x_2 = \dot{y}$$

$$\dot{x}_1 = x_2$$

$$\dot{y} = -3\dot{y} - 2y \Rightarrow$$

$$\Rightarrow \dot{x}_2 = -3x_2 - 2x_1$$

$$\det(\lambda I - A) = 0$$

$$K(s) = \frac{?}{s^2 + 3s + 2}$$

$$\dot{x}_1 = 0x_1 + 1x_2$$

$$\dot{x}_2 = -2x_1 - 3x_2$$

$$\dot{x} = \underbrace{\begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}}_A \cdot x$$

$$\begin{vmatrix} -\lambda & 1 \\ -2 & -3-\lambda \end{vmatrix} = \lambda(3+\lambda) + 2$$

$$= \lambda^2 + 3\lambda + 2 = (\lambda + 1)(\lambda + 2)$$

$$\dot{x} = Ax$$

$$x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

$$\dot{x} = Ax$$

$$y = \underbrace{[1 \ 0]}_{C^T} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = C^T x$$

$$\dot{y} + 3\dot{y} + 2y = \dot{u} - 7u$$

$$\ddot{y} = -3\dot{y} + \dot{u} - 2y - 7u \quad / \int$$

$$\dot{y} = -3y + u + x_1$$

$$\dot{x}_1 = -2y - 7u$$

$$x_2 = y$$

$$\dot{x}_2 = -3x_2 + u + x_1$$

$$\dot{x}_1 = 0x_1 - 2x_2 - 7u$$

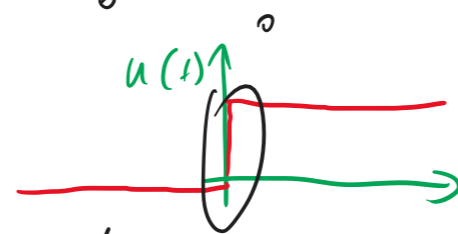
$$\dot{x}_2 = 1x_1 - 3x_2 + 1u$$

$$x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

$$\dot{x} = \begin{bmatrix} 0 & -2 \\ 1 & -3 \end{bmatrix} x + \begin{bmatrix} -7 \\ 1 \end{bmatrix} u$$

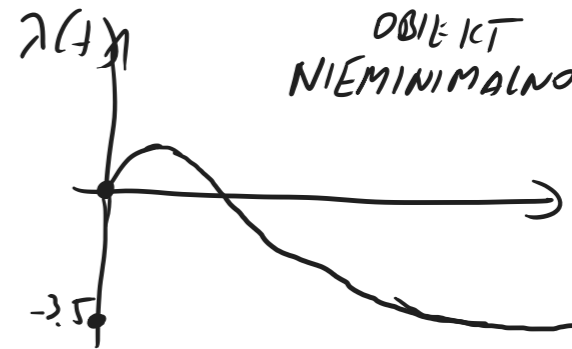
$$y = \begin{bmatrix} 0 & 1 \end{bmatrix} x$$

$$K(s) = \frac{s-7}{s^2+3s+2} = \frac{-7}{s^2+3s+2} + \frac{s}{s^2+3s+2}$$



$$\lim_{t \rightarrow \infty} \lambda(t) = \lim_{s \rightarrow 0} s K(s) =$$

$$= \lim_{s \rightarrow 0} s \cdot \frac{1}{s} K(s) = -\frac{7}{2}$$



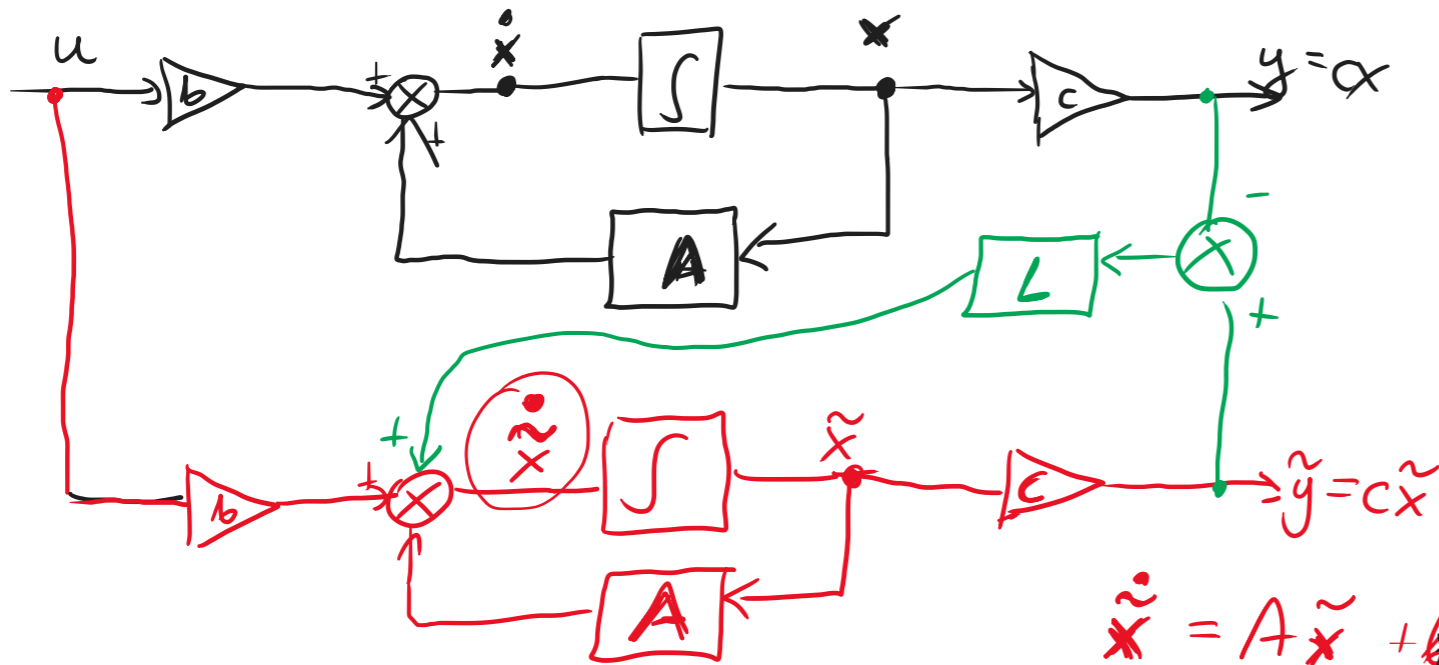
OBIEKT
NIEMINIMALNOFAZOWY

OBSERVATOR STANU LUENBERGERA

A, b, c - znane

$$\dot{x} = Ax + bu$$

$$y = cx$$



$$\dot{\tilde{x}} = A\tilde{x} + bu + L(y - y)$$

$$\dot{\tilde{x}} = A\tilde{x} + bu + Lc(\tilde{x} - x)$$

$$\dot{x} = Ax + bu$$

(1)

$$\underbrace{\dot{\tilde{x}} - \dot{x}}_{\dot{e}} = A(\underbrace{\tilde{x} - x}_e) + Lc(\underbrace{\tilde{x} - x}_e)$$

$$\dot{e} = \overbrace{(A + Lc)}^{A_z} \cdot e$$

$$\begin{bmatrix} \dot{e} \\ \dot{e} \end{bmatrix} = \left(\begin{bmatrix} v & v \\ v & v \end{bmatrix} + \begin{bmatrix} ? \\ ? \end{bmatrix} \begin{bmatrix} v & v \end{bmatrix} \right) \begin{bmatrix} e \\ e \end{bmatrix}$$

II - npd
2D

~~$\dot{x} = Ax$~~