

ESERCIZIO 1

%TESTO A

$$W = 2/(3+s)$$

$$U = 1/(s-2)$$

$$Y = 2/(3+s)/(s-2)$$

$$y = 2/5 \cdot \exp(2 \cdot t) - 2/5 \cdot \exp(-3 \cdot t)$$

%TESTO B

$$W = 3/(2+s)$$

$$U = 1/(s-1)$$

$$Y = 3/(2+s)/(s-1)$$

$$y = \exp(t) - \exp(-2 \cdot t)$$

ESERCIZIO 2b

%TESTO A

$$\text{num} = 400 \quad 80$$

$$\text{den} = 2 \quad 16 \quad 24$$

$$\text{Guadagno di Bode:} \quad K = 3.33333, \quad K_{\text{db}} = 10$$

$$\text{Zero reale:} \quad z = -0.2000 \quad \tau = 5.0000$$

$$\text{Polo reale:} \quad p = -6.0000 \quad \tau = 0.1667$$

$$\text{Polo reale:} \quad p = -2.0000 \quad \tau = 0.5000$$

%TESTO B

$$\text{num} = 30 \quad 30$$

$$\text{den} = 10 \quad 44 \quad 8$$

$$\text{Guadagno di Bode:} \quad K = 3.75, \quad K_{\text{db}} = 11$$

$$\text{Zero reale:} \quad z = -1.0000 \quad \tau = 1.0000$$

$$\text{Polo reale:} \quad p = -4.2100 \quad \tau = 0.2375$$

$$\text{Polo reale:} \quad p = -0.1900 \quad \tau = 5.2625$$

ESERCIZIO 3

%TESTO A

$$A = \begin{bmatrix} -1 & 0 \\ & -2 & -2 \end{bmatrix}$$

$$B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

$$C = \begin{bmatrix} 2 & 2 \end{bmatrix}$$

$$D = 5$$

$$y_0 = \begin{bmatrix} 6 \\ 0 \end{bmatrix}$$

$$x_0 = \begin{bmatrix} -6 \\ 9 \end{bmatrix}$$

$$e^{At} = \begin{bmatrix} \exp(-t), & 0 \\ -2 \cdot \exp(-t) + 2 \cdot \exp(-2 \cdot t), & \exp(-2 \cdot t) \end{bmatrix}$$

$$x_{-1} = \begin{bmatrix} -6 \cdot \exp(-t) \\ 12 \cdot \exp(-t) - 3 \cdot \exp(-2 \cdot t) \end{bmatrix}$$

$$y_{-1} = 12 \cdot \exp(-t) - 6 \cdot \exp(-2 \cdot t)$$

$$V = \begin{bmatrix} 0 & 1 \\ 1 & -2 \end{bmatrix}$$

$$V_{\text{inv}} = \begin{bmatrix} 2 & 1 \\ 1 & 0 \end{bmatrix}$$

$$A_{-} = \begin{bmatrix} -2 & 0 \\ 0 & -1 \end{bmatrix}$$

$$B_{-} = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

$$C_{-} = \begin{bmatrix} 2 & -2 \end{bmatrix}$$

$$D_{-} = 5$$

%TESTO B

A = -1 -2
0 -2

B = 2
2

C = 1 0

D = 5

y0 = 6
0

x0 = 6
-3

$e^{At} = \begin{bmatrix} \exp(-t), & -2\exp(-t)+2\exp(-2*t) \\ 0, & \exp(-2*t) \end{bmatrix}$

$x_{-1} = \begin{bmatrix} 12\exp(-t)-6\exp(-2*t) \\ -3\exp(-2*t) \end{bmatrix}$

$y_{-1} = 12\exp(-t)-6\exp(-2*t)$

V = 1 1
0 0.5

Vinv = 1 -2
0 2

A_ = -1 0
0 -2

B_ = -2
4

C_ = 1 1

D_ = 5