

10.1.18.

$$\begin{matrix} x & & -6 & 2 & x & & x & & 3 \\ & = & & & & & & & \\ y & & -3 & 1 & y & , & y & (0) & = & 4 \end{matrix}$$

$$0 = \det(\mathbf{A} - \lambda \mathbf{I}) = \begin{vmatrix} -6 - \lambda & 2 \\ -3 & 1 - \lambda \end{vmatrix} = \lambda^2 + 5\lambda = \lambda(\lambda + 5)$$

$$\lambda_1 = 0, \quad \begin{matrix} -6 & 2 \\ -3 & 1 \end{matrix} \mathbf{K}_1 = \mathbf{0}, \quad \mathbf{K}_1 = \begin{matrix} 1 \\ 3 \end{matrix}$$

$$\lambda_2 = -5, \quad \begin{matrix} -1 & 2 \\ -3 & 6 \end{matrix} \mathbf{K}_2 = \mathbf{0}, \quad \mathbf{K}_2 = \begin{matrix} 2 \\ 1 \end{matrix}$$

$$\mathbf{X} = \begin{pmatrix} 1 & 2e^{-5t} \\ 3 & e^{-5t} \end{pmatrix} \mathbf{C}$$

$$\begin{pmatrix} 3 \\ 4 \end{pmatrix} = \mathbf{X}(0) = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix} \mathbf{C}, \quad \mathbf{C} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$\mathbf{X} = \begin{pmatrix} 1 & 2e^{-5t} \\ 3 & e^{-5t} \end{pmatrix} \begin{pmatrix} 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 + 2e^{-5t} \\ 3 + e^{-5t} \end{pmatrix}$$

