

$$\begin{bmatrix} 6 & -1 & -3 \\ -1 & 5 & 2 \\ 2 & -1 & 1 \end{bmatrix} \begin{bmatrix} 2 & -1 & -3 \\ -1 & 1 & 2 \\ 2 & -1 & -3 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & -1 & -2 \\ 0 & 1 & 1 \\ -2 & 2 & 4 \\ 2 & -1 & -3 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix} \rightsquigarrow$$

$$\begin{array}{c} \nearrow \\ \underline{0} \leftarrow \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \xleftarrow{A-4I} \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \xleftarrow{A-4I} \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \\ \uparrow \qquad \qquad \uparrow \end{array}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} t \\ -t \\ t \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix} t$$

$$\begin{bmatrix} 2 & -1 & -3 \\ -1 & 1 & 2 \\ 2 & -1 & -3 \end{bmatrix} \begin{bmatrix} 2 & -1 & -3 \\ -1 & 1 & 2 \\ 2 & -1 & -3 \end{bmatrix} = \begin{bmatrix} -1 & 0 & 1 \\ 1 & 0 & -1 \\ -1 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ -1 \end{bmatrix} \neq \underline{0}$$

$(A-4I)^2$

$$\underline{0} \leftarrow \begin{bmatrix} -1 \\ 1 \\ -1 \end{bmatrix} \leftarrow \begin{bmatrix} 2 \\ -1 \\ 2 \end{bmatrix} \xleftarrow{A-4I} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

$$A = C J C^{-1}$$

$$C = \begin{bmatrix} -1 & 2 & 1 \\ 1 & -1 & 0 \\ -1 & 2 & 0 \end{bmatrix} \quad J = \begin{bmatrix} 4 & 1 & \\ & 4 & 1 \\ & & 4 \end{bmatrix} \quad C^{-1}$$

$$\left[\begin{array}{ccc|ccc} -1 & 2 & 1 & 1 & 0 & 0 \\ 1 & -1 & 0 & 0 & 1 & 0 \\ -1 & 2 & 0 & 0 & 0 & 1 \end{array} \right] \xrightarrow{\text{rref}} \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{array} \right] C^{-1}$$

$$\begin{array}{c} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \xleftarrow{A-4I} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \\ \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} \end{array}$$

$$(A-4I) \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

$$C = \begin{bmatrix} x & 1 & 0 \\ x & 0 & 0 \\ x & 0 & 0 \end{bmatrix} \quad J = \begin{bmatrix} 4 & 1 \\ & 4 \\ & & 4 \end{bmatrix} \quad C^{-1} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix} \quad e^{3A} = \begin{bmatrix} 1 & 3 & \frac{9}{2} \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$$

$$e^A = \begin{bmatrix} 1 & 1 & \frac{1}{2} \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

$$(e^{3x})' = 3e^{3x} \quad x=0 \rightarrow 3$$

$$(e^{3x})'' = 9e^{3x} \rightarrow 9$$

2. no.

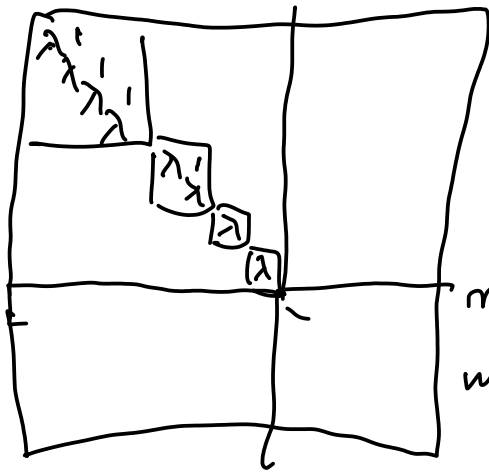
$$\begin{array}{l} p(x) = ax^2 + bx + c \\ p'(x) = 2ax + b \\ p''(x) = 2a \end{array} \quad \begin{array}{l} c \\ b \\ 2a \end{array}$$

$$e^{3x}|_0 = 1 = c$$

$$\begin{array}{l} (e^{3x})'|_0 = 3 = b \\ (e^{3x})''|_0 = 9 = 2a \end{array} \quad \begin{cases} \frac{9}{2}x^2 + 3x + 1 \\ \frac{9}{2}x^2 + 3x + 1 \end{cases}$$

$$\frac{9}{2}A^2 + 3A + I = \frac{9}{2} \begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} + 3 \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix} + \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$A - \lambda I$ 25×25



	0	1	2	3	4	5
25	21	19	18	17	17
4	2	1	1	0		
2	1	0	1			

r	25	21	19	18	17	←	←	←	←	←
mult	0	4	6	7	8	0	←	←	←	←
							←	←	←	←