Sub :

Day

Time : Date : / /

Name : Nasinun Leo

Id : 20-42195-1

Set : B

1. $\begin{pmatrix} 4 & -2 \\ -5 & 1 \end{pmatrix} \Rightarrow \begin{vmatrix} 4-\lambda & -2 \\ -5 & 1-\lambda \end{vmatrix} \Rightarrow (4-\lambda)(1-\lambda) - 10 = 0$

$\Rightarrow 4 - 4\lambda - \lambda + \lambda^2 - 10 = 0$

$\Rightarrow \lambda^2 - 5\lambda - 6 = 0$

$\Rightarrow \lambda^2 - 6\lambda + \lambda - 6 = 0$

~~$\Rightarrow (\lambda - 3)$~~ $\lambda = -1, 6$

2. $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$

$\begin{vmatrix} 2-\lambda & 2 & 1 \\ 1 & 3-\lambda & 1 \\ 1 & 2 & 2-\lambda \end{vmatrix} = (2-\lambda)((3-\lambda)(2-\lambda) - 2) - 2((2-\lambda) - 1) + 1(2 - 3 + \lambda) = 0$

$\Rightarrow (2-\lambda)\{6 - 3\lambda - 2\lambda + \lambda^2 - 2\} - 2 + 2\lambda + \lambda - 1 = 0$

3. $\alpha u + \beta v + \gamma w = 0 \quad \alpha = 0, \beta 0, \gamma = 0$

$(A - \lambda I)N = 1$

$N = \begin{pmatrix} a \\ ~~a~~ a \\ a \end{pmatrix}$

4. $A^3 - 7A^2 + 11A - 5I = 0$

$\Rightarrow A^2 - 7A + 11I - 5A^{-1} = 0$

$\Rightarrow A^{-1} = \frac{1}{5}(A^2 - 7A + 11I)$

5. $v_1 = [-1, 1]^T \quad (\lambda = -1) \quad v_2(t) = [1, 1]^T \quad (\lambda = 3)$

$C_1 v_1 e^{-1t} + C_2 v_2 e^{3t} =$

$C_1 = 1, \; C_2 = 2$

6. $\begin{vmatrix} 1-\lambda & 0 & 0 \\ 4 & 6-\lambda & 6 \\ -1 & -4 & -3-\lambda \end{vmatrix} = 0 \Rightarrow (1-\lambda)\{(6-\lambda)(-3-\lambda) + 24\} = 0$

$\Rightarrow (1-\lambda)(-18 - 6\lambda + 3\lambda + \lambda^2 + 24) = 0$

$\Rightarrow (1-\lambda)(\lambda^2 - 3\lambda + 6) = 0$

$\Rightarrow \lambda^2 - 3\lambda + 6 - \lambda^3 + 3\lambda^2 - 6\lambda = 0$

$\Rightarrow -\lambda^3 + 4\lambda^2 - 9\lambda + 6 = 0$

7. $\begin{vmatrix} -3-\lambda & 2 \\ 5 & 4-\lambda \end{vmatrix} \Rightarrow (-3-\lambda)(4-\lambda) - 10 = 0$

$\Rightarrow -12 + 3\lambda - 4\lambda + \lambda^2 - 10 = 0$

$A^2 - A - 22I = 0 \Rightarrow \lambda^2 - \lambda - 22 = 0$

8. $\lambda^3 - 2\lambda^2 - 5\lambda + 6 = 0$

$\Rightarrow \lambda^2(\lambda - 2) - 5\lambda + 6 = 0$

$\Rightarrow \lambda = 1, 3, -2$