Q1 find the value of k

$$A = \begin{bmatrix} 2 & 7 & 3 \\ -2 & k & 5 \\ 0 & 3 & 2 \end{bmatrix}$$

$$2\begin{bmatrix} -2 & k \\ 0 & 3 \end{bmatrix} - 7\begin{bmatrix} -2 & 5 \\ 0 & 2 \end{bmatrix} + 3\begin{bmatrix} -2 & k \\ 0 & 3 \end{bmatrix}$$

$$2((-2\times3) - 0(k)] - 7[-2\times2 - 0\times5] + 3[-2\times3 - 0(k)]$$

$$2(-6] - 7[-4] + 3[-6].$$

$$-12 + 28 - 18$$

$$-30 + 28$$

$$|A| = -2$$

$$\boxed{k = -2}$$

$$\begin{array}{r} 12 \\ 18 \\ \hline 30 \end{array}$$

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(2) Rolle's theorem

$f(x) = x^2 - 2x - 3$ in $(1,3)$

→ $f(x)$ is continous $[a,b]$

→ $f(x)$ is differitiable in (a,b)

→ the their ∃ atleast one pt 'c' (a,b) such that $f'(c) = 0$

$f(1) = (1)^2 - 2(1) - 3$

$f(1) = 1 - 2 - 3$

$f(1) = 1 - 5$

$f(1) = -4$

$f(x) = x^2 - 2x - 3$

$f(3) = 3^2 - 2(3) - 3$

$f(3) = 9 - 6 - 3$

$f(3) = 9 - 9 = 0$

$\therefore$ Here $f(1) \neq f(3)$ So it is not continious

$\therefore$ Hence It is not continious so not differentiable

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(3) $\lim\limits_{\substack{x \to 1 \\ y \to 1}} \dfrac{2x^2 y}{x^2 + y^2 + 1}$

Sol: $\lim\limits_{\substack{x \to 1 \\ y \to 1}} \dfrac{2x^2 y}{x^2 + y^2 + 1} \Rightarrow \lim\limits_{\substack{x \to 1 \\ y \to 1}} \dfrac{2(1)^2(1)}{(1)^2 + (1)^2 + 1} = \dfrac{2}{3}$ //

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(4) eigen value & eigen vector $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & -1 & 1 \end{bmatrix}$

Sol:

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

$|A - \lambda I| = 0$

$\begin{vmatrix} 1-\lambda & 1 & 1 \\ 1 & 1-\lambda & 1 \\ 1 & -1 & 1-\lambda \end{vmatrix} = 0$

$\Rightarrow 1-\lambda\left((1-\lambda)(1-\lambda)-(-1)(1)\right] - 1\left[1(1-\lambda)-(1)(1)\right]$

$+1\left[1(-1)-(1)(1-\lambda)\right]$

$\Rightarrow 1-\lambda\left(1-\lambda-\lambda+\lambda^2+1\right] - 1\left(\cancel{1}-\lambda-\cancel{1}\right)+1\left(-1-1+\lambda\right]$

$\Rightarrow 1-\lambda\left[\lambda^2-2\lambda+2\right]-1\left(-\lambda\right]+1\left(-2+\lambda\right]$

$\Rightarrow \lambda^2-2\lambda+\cancel{2}-\lambda^3+2\lambda^2-2\lambda+\lambda-\cancel{2}+\lambda$

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

$-\lambda^3+3\lambda^2(-4+2]\lambda=0$

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

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

$\boxed{\lambda=2,1,0}$

$\boxed{\lambda=2}$

Case i $\begin{bmatrix} 1-\lambda & 1 & 1 \\ 1 & 1-\lambda & 1 \\ 1 & -1 & 1-\lambda \end{bmatrix}$

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

$= \begin{pmatrix} -1 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & -1 & -1 \end{pmatrix}$

$R_3 \to R_3 - R_2$

$(1) - (1) = 0$
$(-1) - (-1) = 0$
$(-1) - (1) = -2$

$R_2 \to R_2 + R_1$

$(1) + (-1) = 0$
$(-1) + (1) = 0$
$(1) + (1) = 2$

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

$R_3 \to R_3 + R_2$

$(0) + (0) = 0$
$(0) + (0) = 0$
$(-2) + (2) = 0$

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

$-x_1 + x_2 + x_3 = 0$

$2x_3 = 0 \quad x_3 = 0/2$

$\boxed{x_3 = 0}$

consider $\boxed{x_2 = k}$

$-x_1 + k + 0 = 0$

$+x_1 = +k$

$\boxed{x_1 = 1}$

$$X_1 = \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix}$$

<u>case ii</u> $\lambda = 1$

$$\begin{bmatrix} 1-1 & 1 & 1 \\ 1 & 1-1 & 1 \\ 1 & -1 & 1-2 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & -1 & 0 \end{bmatrix}$$

$R_3 \to R_3 - R_1$

$1 - 1 = 0$
$-1 - 0 = -1$
$0 - 1 = -1$

$R_2 \leftrightarrow R_1$

$$\sim \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & -1 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & -1 & -1 \end{bmatrix}$$

$R_3 \to R_3 + R_2$

$0 + 0 = 0$
$-1 + 1 = 0$
$-1 + 1 = 0$

$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

$x_1 + x_3 = 0$

$x_2 + x_3 = 0$

$x_2 = x_3$

consider $\boxed{x_2 = k}$

$\boxed{k = x_3}$

$x_1 + k = 0$

$\boxed{x_1 = -k}$

$$X_2 = \begin{pmatrix} -k \\ k \\ k \end{pmatrix} = \begin{pmatrix} -1 \\ 1 \\ 1 \end{pmatrix}$$ //-

Case iii, $\lambda = 0$

$$\begin{bmatrix} 1-0 & 1 & 1 \\ 1 & 1-0 & 1 \\ 1 & -1 & 1-0 \end{bmatrix} \Rightarrow \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & -1 & 1 \end{pmatrix}$$

$R_3 \longleftrightarrow R_1$

$$\sim \begin{bmatrix} 1 & -1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

$R_2 \longrightarrow R_2 - R_3$

$1 - 1 = 0$

$1 - 1 = 0$

$1 - 1 = 0$

$R_3 \longrightarrow R_3 - R_2$

$1 - 1 = 0$

$1 - 1 = 0$

$1 - 1 = 0$

$$\begin{bmatrix} 1 & -1 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$X_3 = \begin{bmatrix} -k \\ k \\ 2k \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ 2 \end{bmatrix}$$ //-

$x_1 - x_2 + x_3 = 0$

consider $\boxed{x_2 = k}$; $\boxed{x_3 = 2k}$

$x_1 - k + 2k = 0$

$x_1 + k = 0 \Rightarrow \boxed{x_1 = -k}$

③ $y^2 = 4ax$ is $27ay^2 = 4(x-2a)^3$

Given $y^2 = 4ax$ where 'a' is parameter

Center of curvature $X = x - \left[\frac{y_1(1+y_1^2)}{y_2}\right]$

$Y = y + \left[\frac{1+y'^2}{y''}\right]$

$y^2 = 4ax$

$2yy' = 4a$

$y' = \frac{\cancel{4}^{2}a}{\cancel{2}_{1}y} = \frac{2a}{y}$

$y'' = -\frac{2a}{y^2}y'$

$y'' = -\frac{2a}{y^2}\left(\frac{2a}{y}\right) \Rightarrow -\frac{4a}{y^3}$

$X = x - \left[\frac{\frac{2a}{y}\left(1+\frac{2a}{y^2}\right)^2}{-\frac{4a}{y^3}}\right] = x - \left[\frac{\frac{2a}{\cancel{y}}\left(\frac{\cancel{y^2}+4a^2}{\cancel{y^2}}\right)}{\frac{-4a}{y^{\cancel{3}}}}\right]$

y^2

$\boxed{X = 3x}$

$\cancel{X} = x + \left[\frac{y^2+4a^2}{2a}\right]$

$$X = x + \left[\frac{4ax + 4a^2}{2a}\right]$$

$$X = x + \frac{\cancel{2a}\left[2x + 2a\right]}{\cancel{2a}} \qquad y^2 = 4ax$$

$$X = x + 2x + 2a$$

$$X = 3x + 2a$$

$$X - 2a = 3x$$

$$x = \frac{X - 2a}{3}$$

$$3x = X - 2a$$

$$Y = y + \left[\frac{1 + \left(\frac{2a}{y}\right)^2}{-\frac{4a^2}{y^3}}\right]$$

$$Y = y + \left(\frac{1 + \frac{4a^2}{y^2}}{-\frac{4a^2}{y^3}}\right)$$

$$Y = y + \left(\frac{\frac{\cancel{y^2} + 4a^2}{\cancel{y^2}}}{-\frac{4a^2}{\cancel{y^3}}}\right)$$

$$= y + \left[\frac{y^3 + 4a^2 y}{-4a^2}\right] \Rightarrow y + \left(\frac{y^3 + 4a^2 y}{4a}\right)$$

$$= y - \frac{y}{4a}\left(y^2 + 4a^2\right]$$

$$= \sqrt{4ax} - \frac{\sqrt{4ax}}{4a^2}\left(4ax + 4a^2\right]$$

$$= 2\sqrt{ax} - \frac{2\sqrt{ax}}{\cancel{4}\cancel{a^2}}\,\cancel{4}\cancel{a}(x+a)$$

$$= 2\sqrt{ax} - \frac{2\sqrt{ax}(x+a)}{a}$$

$$= 2\sqrt{ax}\left(1 - \frac{x+a}{a}\right) = 2\sqrt{ax}\left(\frac{\cancel{a} - x - \cancel{a}}{a}\right)$$

$$y = \frac{\sqrt{4ax}\,(-x)}{a}$$

$$y = \frac{-2x^{3/2}}{\sqrt{a}}$$

S O B S

$$y^2 = \left(-\frac{2x^{3/2}}{\sqrt{a}}\right)^2$$

$$y^2 = \frac{4x^3}{a} \Rightarrow \frac{4\left(x - \frac{2a}{3}\right)^3}{a}$$

$$y^2 = \frac{4}{a}\left[x - \frac{2a}{3}\right]^3$$

$$y^2 = 4/a\left(\frac{x - 2a)^3}{27}\right.$$

$$\cancel{4}\,27y^2a = 4(x - 2a)^3 //$$

① $A = \begin{bmatrix} 5 & 7 & 3 \\ -2 & k & 5 \\ 0 & 3 & 2 \end{bmatrix}$ is -10 then find k.

$|A - \lambda I| = 0$

$$\begin{vmatrix} 5-\lambda & 7 & 3 \\ -2 & k-\lambda & 5 \\ 0 & 3 & 2-\lambda \end{vmatrix}$$

$$5-\lambda \begin{vmatrix} k-\lambda & 5 \\ 3 & (2-\lambda) \end{vmatrix} - 7\begin{bmatrix} -2 & 5 \\ 0 & 2-\lambda \end{bmatrix} + 3\begin{bmatrix} -2 & k-\lambda \\ 0 & 3 \end{bmatrix}$$

$5-\lambda\left((k-\lambda)(2-\lambda) - 3(5)\right] - 7\left[-2(2-\lambda) - 0(5) + 3\right.$
$(-2(3) - 0(k-\lambda)$

$5-\lambda\left[2k - \cancel{k\lambda} - 2\lambda + \cancel{k\lambda} - 15\right] - 7\left[-4+2\lambda\right] + 3\left[-6\right]$

$5-\lambda\left[2k - 2\lambda - 15\right] - 7\left[-4+2\lambda\right] + 3\left[-6\right]$

$10k - \underline{10\lambda} - 75 - \underline{2k\lambda} + 2\lambda^2 + \underline{15\lambda} + 28 - \underline{14\lambda} - 18 = 0$

18
28
75

$2\lambda^2 + 10k\lambda(-10 - 2k + 15 - 14) - 75 - 18 + 28 = 0$

$2\lambda^2 + 10k - 11\lambda - 65 = 0$

(6)

$$f(x,y) = \begin{cases} \dfrac{xy}{x^2+y^2}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$$

$$\lim_{\substack{x \to 0 \\ y \to 0}} f(x,y) = \lim_{\substack{x \to 0 \\ y \to mx}} f(x,y)$$

$$= \lim_{\substack{y \to mx \\ x \to 0}} f(x,y)$$

$$\lim_{\substack{y \to mx \\ x \to 0}} \left[\frac{xy}{x^2+y^2}\right]$$

$$\lim_{x \to 0} \left(\frac{x(mx)}{x^2+(mx)^2}\right)$$

$$\lim_{x \to 0} \left[\frac{x^2 m}{x^2+m^2x^2}\right]$$

2
15
$\times 5$
75

$$\lim_{x \to 0} \left[\frac{\cancel{x^2} m}{\cancel{x^2}(1+m^2)}\right]$$

$$\lim_{x \to 0} \left[\frac{m}{1+m^2}\right]$$ which not unique //-

$$\therefore \lim_{\substack{y \to mx \\ x \to 0}} \frac{m}{1+m^2}$$

It will be different for different 'm'

$\therefore \lim_{\substack{y \to 0 \\ x \to 0}} f(x,y)$ doesn't exist //.

(8) Taylor series of $f(x) = \sin x$ about $x = \frac{\pi}{4}$

$f(x) = \sin x = \sin(\pi/4) = 1/\sqrt{2}$

$f'(x) = \cos x) = \cos(\pi/4) = 1/\sqrt{2}$

$f''(x) = -\sin x = -\sin(\pi/4) = -1/\sqrt{2}$

$f'''(x) = -\cos x = -\cos \pi/4) = -1/\sqrt{2}$

$\sin x = 1 + \frac{1/\sqrt{2}}{1!}(x) + \cancel{\frac{\frac{1}{\sqrt{2}}}{2!}(x^2)} + \frac{\frac{1}{\sqrt{2}}}{3!}(x^3) - \frac{1/\sqrt{2}}{4!} \ldots$

$\sin x = 1 + \frac{\frac{1}{\sqrt{2}}}{1!}x - \frac{\frac{1}{\sqrt{2}}}{3!} + \cdots$

If $v = (x^2+y^2+z^2)^{-1/2}$ find $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} + \frac{\partial^2 v}{\partial z^2}$

$v = (x^2+y^2+z^2)^{-1/2}$

$\frac{\partial v}{\partial x} = \frac{-1}{2}(x^2+y^2+z^2)^{-1/2-1} \times \left(\frac{\partial}{\partial x}(x^2+y^2+z^2)\right)$

$= \frac{-1}{2}(x^2+y^2+z^2)^{-3/2} \times (2x) +$

$\frac{\partial v}{\partial x} = -x(x^2+y^2+z^2)^{-3/2}$

$$\frac{\partial^2 v}{\partial x^2} = \frac{\partial}{\partial x}\left(\frac{\partial v}{\partial x}\right) = -\frac{\partial}{\partial x}\left[x(x^2+y^2+z^2)^{3/2}\right]$$

If $u = x^y$ Show that $\frac{\partial^3 u}{\partial x^2 \partial y} = \frac{\partial^3 u}{\partial x \partial y \partial x}$

L.H.S

$$\frac{\partial^3 u}{\partial x^2 \partial y} \Rightarrow \frac{\partial^3 u}{\partial x \partial x \partial y} = \frac{\partial}{\partial x}\left[\frac{\partial}{\partial x}\left[\frac{\partial u}{\partial y}\right]\right]$$

$u = x^y$

p.D. 'u' w.r.t 'y'

$$\frac{\partial u}{\partial y} = \frac{\partial}{\partial y}[x^y] \qquad \frac{d}{dy}[a^{\cdot}$$

$$\frac{\partial}{\partial y}(x^y) = x^y \log x$$

$$\frac{\partial}{\partial x}\left[\frac{\partial u}{\partial y}\right] = \frac{\partial}{\partial x}\left[x^y \log x\right] \qquad \frac{\partial}{\partial x}[uv] = u\frac{\partial v}{\partial x} + v\frac{\partial u}{\partial x}$$

$$= x^y\left[\frac{1}{x}\right] + \log x\,(y \cdot x^{y-1}) \qquad \frac{\partial}{\partial x}(\log x) = \frac{1}{x}$$

$$= x^{y-1} + \log x\,(y \cdot x^{y-1}) \qquad \frac{\partial}{\partial x}(x^y) = y \cdot x^{y-1}$$

$$\frac{\partial}{\partial x}\left[\frac{\partial u}{\partial y}\right] = x^{y-1}\left[1 + y\log x\right] \qquad \frac{x^y}{x} = x^{y-1}$$

$$\frac{\partial}{\partial x}\left[\frac{\partial}{\partial x}\left[\frac{\partial u}{\partial y}\right]\right] = \frac{\partial}{\partial x}\left(x^{y-1}(1+y\log x)\right] — (2)$$

let us Consider R.H.S

$$\frac{\partial^3 u}{\partial x^2 \partial y \partial x} = \frac{\partial}{x}\left(\frac{\partial}{\partial y}\left[\frac{\partial u}{\partial x}\right]\right]$$

$$u = x^y$$

$$\frac{\partial u}{\partial x} = \frac{\partial}{\partial x}(x^y]$$

$$\frac{\partial u}{\partial x} = y \cdot x^{y-1}$$

$$\frac{\partial}{\partial y}\left[\frac{\partial u}{\partial u}\right] = \frac{\partial}{\partial y}\left[y - x^{y-1}\right]$$

$$= y[x^{y-1}\log x] + x^{y-1} — (1)$$

$$y\ (x^{y-1}\log x] + x^{y-1}$$

$$x^{y-1}[y\log x + 1]$$

$$\frac{\partial}{\partial y}\left(\frac{\partial u}{\partial x}\right] = x^{y-1}[1 + y\log x]$$

$$\frac{\partial}{\partial x}\left[\frac{\partial}{\partial y}\left(\frac{\partial u}{\partial x}\right)\right] = \frac{\partial}{\partial x}\left[x^{y-1}(1+y\log x)\right] — (3)$$

$\therefore$ eq ② = ③

$$\frac{\partial^3 u}{\partial x^2 \partial y} = \frac{\partial^3 v}{\partial x \partial y \partial x}$$ hence proved //-

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partial derivatives $u = \cos^{-1}\left(\frac{x}{y}\right)$

sol

$\cos^{-1}(x/y)$ — ①

Partially Differentiate eq ① w.r.t x

$$\frac{\partial u}{\partial x} = \frac{\partial}{\partial x}\left(\cos^{-1}(x/y)\right)$$

$$= \frac{-1}{\sqrt{1-\left(\frac{x}{y}\right)^2}} \times \frac{\partial}{\partial x}\left(\frac{x}{y}\right)$$

$$= \frac{-1}{\sqrt{1-\frac{x^2}{y^2}}} \times \frac{1}{y} \quad ①$$

$$= \frac{-1}{\sqrt{\frac{y^2-x^2}{y^2}}} \times \frac{1}{y} \Rightarrow \frac{-y^2}{\sqrt{y^2-x^2}} \times \frac{1}{y}$$

$$= \frac{-y \times \frac{1}{y}}{\sqrt{y^2-x^2}} = \frac{-1}{\sqrt{y^2-x^2}}$$

Simillary

$$\frac{\partial u}{\partial y} = \frac{\partial}{\partial y}\left[\cos^{-1}(x/y)\right]$$

$$= \frac{-1}{\sqrt{1-\left(\frac{x}{y}\right)^2}}$$

$$\because \frac{\partial}{\partial y}(\cos^{-1} y) = \frac{-1}{\sqrt{1-y^2}}$$

$$= \frac{-1}{\sqrt{1-\frac{x^2}{y^2}}}$$

$$\frac{\partial}{\partial y}\left(\frac{x}{y}\right) = x\frac{\partial}{\partial y}\left(\frac{1}{y}\right)$$

$$= \frac{-1}{\sqrt{\frac{y^2-x^2}{y^2}}} \times x \times \frac{\partial}{\partial y}\left(\frac{1}{y}\right) \qquad \frac{\partial}{\partial y}\left(\frac{1}{y}\right) = \frac{-1}{y^2}$$

$$= \frac{y^2}{\sqrt{y^2-x^2}} \times x \times \left[\frac{-1}{y^2}\right]$$

$$= \frac{-\cancel{y}}{\sqrt{y^2-x^2}} \times \frac{-x}{\cancel{y^2}} = \frac{x/y}{\sqrt{y^2-x^2}}$$

$$\frac{\partial u}{\partial y} = \frac{x}{y\sqrt{y^2-x^2}} //$$

Caley Hamilton theorem $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$

$A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$

$(A - \lambda I) = 0$

$= \begin{bmatrix} 3-\lambda & 2 \\ 1 & 4-\lambda \end{bmatrix}$

$= (3-\lambda)(4-\lambda) - 1(2)$

$= 12 - 3\lambda - 4\lambda + \lambda^2 - 2$

$= 10 - 7\lambda + \lambda^2$

$= \lambda^2 - 7\lambda + 10$

replace 'λ' with 'A'

$A^2 - 7A + 10 = 0$

$\times \cdot 6 \le A^{-1}$

$A^2A^{-1} - 7AA^{-1} + 10A^{-1} = 0A^{-1}$

$A^2A^{-1} - 7AA^{-1} = -10A^{-1}$

$\frac{1}{10}[A^2A^{-1} - 7AA^{-1}] = A^{-1}$

$A^{-1} = -A + 7I$

$\frac{1}{10}\left[-\begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix} + 7\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\right] = A^{-1}$

$$= \frac{1}{10}\left(\begin{bmatrix} -3 & -2 \\ -1 & -4 \end{bmatrix} + \begin{bmatrix} 7 & 0 \\ 0 & 7 \end{bmatrix}\right)$$

$$= \frac{1}{10}\begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 4/10 & -2/10 \\ -1/10 & 3/10 \end{bmatrix}$$

$$x_1^2 + 2i x_1 x_2 - 8x_1 x_3 + 4i x_2 x_3 + 4x_3^2$$

$$\begin{array}{c|ccc} & x_1 & x_2 & x_3 \\ \hline x_1 & 1 & 2i/2 & -8/2 \\ x_2 & 2i/2 & 0 & 4i/2 \\ x_3 & -8/2 & 4i/2 & 4 \end{array}$$

$$= \begin{bmatrix} 1 & i & -4 \\ i & 0 & 2i \\ -4 & 2i & 4 \end{bmatrix}$$

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

$A^{-1} = A$; A is Symetric matrix