$ax + by + cz = 2$
$dx + e\ldots + \ldots - 3$
4

$$\begin{bmatrix} a & b & c & 2 \\ d & e & f & 3 \\ g & h & i & 4 \end{bmatrix}$$

Augemented

Unique

Rank

$V_1 = [x_1, x_2 - - - x_K]$

$\boxed{a_1 x_1 + a_2 x_2 + - - a_K x_K = 0}$

$a_1, a_2, a_3 - - - - a_K \neq 0$

$a_1 = 0, \; a_2 = 0, \; a_3 \; \cdots$

$a_k = 0$

$S = (2,2), (1,2)$ LI.

$$\boxed{\begin{aligned} 2c_1 + c_2 &= 0 \\ 2c_1 + 2c_2 &= 0 \end{aligned}}$$

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

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

Unique.

$2c_1 + c_2 = 0$

$c_2 = 0$

$$\boxed{c_2 = 0, \; c_1 = 0}$$

Product of Eigen values = $|A|$
Sum of Eign values = trace of A

$$|A - \lambda I| = 0$$

$\lambda =$

$$\begin{vmatrix} 8-\lambda & -6 & 2 \\ -6 & 7-\lambda & -4 \\ 2 & -4 & 3-\lambda \end{vmatrix} = 0$$

$\lambda = 0, 15, 3$

$AX = \lambda X$

$(A - \lambda I) X = 0$

$AX = B$

$$\begin{array}{c} \\ \\ \\ \end{array}\begin{array}{ccc} x_1 & x_2 & x_3 \\ \end{array}$$

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$\frac{x_1}{\begin{vmatrix} 7 & -4 \\ -4 & 3 \end{vmatrix}} = \frac{-x_2}{\begin{vmatrix} -6 & -4 \\ 2 & 3 \end{vmatrix}} = \frac{x_3}{\begin{vmatrix} -6 & 7 \\ 2 & -4 \end{vmatrix}}$$

$$\frac{x_1}{5} = \frac{x_2}{10} = \frac{x_3}{10}$$

$$x_1 = \frac{x_2}{2} = \frac{x_3}{2}$$

$$x_1 = \frac{x_2}{2} = \frac{x_3}{2}$$

$$\begin{pmatrix} x_1 \\ x_2 \\ x_2 \end{pmatrix} = k \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix}$$

LHS

$a_1t^2+b_1t+c_1$ (+)

$a_2t^2+b_2t+c_2$

$b=a+1$

$b_1=a_1+1$, $b_2=a_2+1$

$b_1+b_2=a_1+a_2+2$

RHS

$\boxed{(a_1+a_2)t^2+(b_1+b_2)t+(c_1+c_2)}$

$a_3t^2+b_3t+c_3$

$b_3=a_3+1$

$\boxed{b_1+b_2=a_1+a_2+1}$

$t^2=a$ $\qquad t=b$

$(a_1+a_2)t^2+(a_1+1+a_2+1)t+c_1+c_2$

$a_1t^2+b_1t+c$ $\qquad b_1=a_1+1$

$\boxed{\text{coeff } t = \text{coeff } t^2+1}$

$1=0$

$rb=ra+1$ $\qquad \boxed{0=1}$

For every r this is not true

$\lambda = 0$

$\boxed{0 - 1}$

Vector space $R^2[a, b]$

1) $(a_1, b_1) \oplus (a_2, b_2) \in V$

2) $c \odot (a, b) \in V$

3) zero vector "

$$c_1 + c_2 + c_3 = 2$$
$$2c_1 + 0 + c_3 = 1$$
$$c_1 + 2c_2 + 0 = 5$$

$$\begin{array}{cccc} & c_1 & c_2 & c_3 \\ R_1 & 1 & 1 & 1 \\ R_2 & 2 & 0 & 1 \\ R_3 & 1 & 2 & 0 \end{array}$$

$1 - 2 \times 2$

$R_2 = R_2 - 2R_1 \rightarrow 1 - 4$

$R_3 = R_3 - R_1$

-3

$5 - 2$

$$\begin{array}{c} \\ \times 4 \end{array} \begin{array}{c} C_1 \\ \left[\begin{array}{ccc:c} 1 & 4 & 1 & 2 \\ 0 & -2 & -1 & -3 \\ 0 & 1 & -1 & 3 \end{array}\right] \end{array} \begin{array}{l} R_1 \\ R_2 \\ R_3 \end{array}$$

C_2

$R_3 = 2R_3 + R_2$

$$\left[\begin{array}{ccc} 1 & 1 & 1 \\ 0 & 2 & -1 \\ 0 & 0 & -3 \end{array}\right]$$

R_2

$$\begin{array}{cccc} C_1 & C_2 & C_3 = 3 & \\ \end{array}$$

$$\left[\begin{array}{ccc:c} 1 & 1 & 1 & 2 \\ 0 & 2 & -1 & -3 \\ 0 & 0 & 3 & 3 \end{array}\right]$$

$\rho(A\ B) = 3$

0 0 0 zero row

$\rho = 3$

$\rho(A) = \rho(A : B) = n$

Unique sol

$\rho(A) = \rho(A : B) < n$

Infinite sol

$\rho(A) \neq \rho(A=B)$

nc SOL

$c_1 + c_2 + c_3 = 2$

$2c_2 - c_3 = -3$

$3c_3 = 3$

$c_3 = 1$

$c_2 =$

$1 \quad t^2 = 2c_1 + c_2 + 5c_3 = c_4 = 1$

$$\left[\begin{array}{cccc:c} 2 & 1 & 5 & -1 & 1 \\ 1 & -2 & -5 & -3 & 1 \\ 2 & 0 & 2 & -2 & 2 \end{array}\right]$$

$2R_2 - R_1, \quad R_3 = R_3 - R_1$

$$\times 5 \left[\begin{array}{cccc:c} 2 & 1 & 5 & -1 & 1 \\ 0 & -5 & -15 & -5 & 1 \\ 0 & -1 & -3 & -1 & 1 \end{array}\right]$$

$R_3 = 5R_3 - R_2$

$$\left[\begin{array}{cccc:c} 2 & 1 & 5 & -1 & 1 \\ 0 & -5 & -15 & -5 & 1 \\ 0 & 0 & 0 & 0 & 4 \end{array}\right]$$

$\rho(A) = 2$

$\rho(AB) = 3$ $\neq$

No $\exists$!