

Open Office

$$\begin{vmatrix} \lambda-6 & 4 & -2 \\ -1 & \lambda-2 & -1 \\ 1 & -2 & \lambda-3 \end{vmatrix} = - \begin{vmatrix} 1 & -2 & \lambda-3 \\ -1 & \lambda-2 & -1 \\ \lambda-6 & 4 & -2 \end{vmatrix}$$

$$= - \begin{vmatrix} 1 & -2 & \lambda-3 \\ 0 & \lambda-4 & \lambda-4 \\ 0 & 2(\lambda-4) & \end{vmatrix}$$

$$= - \frac{\begin{vmatrix} \lambda-6 & 4 & -2 \\ \lambda-6 & -2(\lambda-6) & (\lambda-3)(\lambda-6) \\ 0 & 2\lambda-8 & -\lambda^2+9\lambda-20 \end{vmatrix}}{(\lambda-4)(\lambda-5)}$$

$\begin{matrix} \lambda-6 & 4 & -2 \\ \lambda-6 & -2(\lambda-6) & (\lambda-3)(\lambda-6) \\ 0 & 2\lambda-8 & -\lambda^2+9\lambda-20 \end{matrix}$
 $\begin{matrix} \lambda-6 & 4 & -2 \\ \lambda-6 & -2(\lambda-6) & (\lambda-3)(\lambda-6) \\ 0 & 2(\lambda-4) & -(\lambda^2-9\lambda+20) \end{matrix}$
 $\begin{matrix} \lambda-6 & 4 & -2 \\ \lambda-6 & -2(\lambda-6) & (\lambda-3)(\lambda-6) \\ 0 & 2(\lambda-4) & -(\lambda-4)(\lambda-5) \end{matrix}$

$$= - \begin{vmatrix} \lambda-4 & \lambda-4 \\ \lambda-4 & -(\lambda-4)(\lambda-5) \end{vmatrix}$$

$$= - (\lambda-4)^2 \begin{vmatrix} 1 & 1 \\ 1 & -(\lambda-5) \end{vmatrix}$$

$$= - (\lambda-4)^2 (-(\lambda-5)-1)$$

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

$$B = \begin{pmatrix} 1 & 2 & 3 \end{pmatrix}$$

prospen Latex a style file.

$$(i j k) \quad i \neq j, j \neq k, k \neq i$$

$$(1 \overset{\curvearrowright}{3} 2) \rightarrow (123) \quad \sigma(132) = -1$$

$$(2 \overset{\curvearrowright}{1} 3) \rightarrow (123) \quad \sigma(213) = -1$$

$$(231) \rightarrow (3 \overset{\curvearrowright}{2} 1) \quad \sigma(231) = 1$$

$\downarrow$
(123)

$$\det(\vec{x}_i, \vec{x}_j, \vec{x}_k) = \sigma(ijk) \det(\vec{x}_1, \vec{x}_2, \vec{x}_3)$$

$(ijk) \equiv 1234$

$$(\vec{x}_1, \vec{x}_2, \vec{x}_3) \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} = a_1 \vec{x}_1 + a_2 \vec{x}_2 + a_3 \vec{x}_3$$

$$(\vec{x}_1, \vec{x}_2, \vec{x}_3) \times (\vec{a}, \vec{b}, \vec{c}) = (\vec{x}_1 \times \vec{a}, \vec{x}_2 \times \vec{b}, \vec{x}_3 \times \vec{c})$$

$$\sum_{i=1}^3 a_i \vec{e}_i = \vec{0} \quad \text{if } a_i \in \mathbb{R}$$

N.B. $\det(\vec{x}_1, \vec{x}_1, \vec{x}_3) = 0$

$$\det(\vec{a}, \vec{b}, \vec{c})$$

$$= \sum_{(ijk)} a_i b_j c_k \sigma(ijk)$$

定理 $A, X: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ invertible

$$\det(AX) = \det(A) \det(X)$$

(3.1)

$$A: \mathbb{R}^3 \rightarrow \mathbb{R}^3 \Rightarrow \det(A) \neq 0$$

$$\det(A \cdot A^{-1}) = \det(I_3) = 1$$

$$\det(A) \det(A^{-1})$$

N.B. = Natur Bijen

~~$$y\vec{e}_1 + x\vec{e}_2 + z\vec{e}_3 = \vec{a}$$~~

$$x\vec{a} + y\vec{e}_1 + z\vec{e}_3 = \vec{a}$$

$$y\vec{e}_1 + x\vec{a} + z\vec{e}_3 = \vec{a}$$

$\Downarrow$

$$x = \frac{|\vec{a} \vec{e}_1 \vec{e}_3|}{|\vec{a} \vec{e}_1 \vec{e}_3|}$$

$$y = \frac{|\vec{a} \vec{a} \vec{e}_3|}{|\vec{e}_1 \vec{a} \vec{e}_3|} = \frac{|\vec{a} \vec{a} \vec{e}_3|}{|\vec{a} \vec{e}_1 \vec{e}_3|}$$

(3.2)

$$\bar{x} = \frac{|\begin{smallmatrix} 0 \\ 0 \\ 0 \end{smallmatrix} \vec{e}_1 \vec{e}_3|}{|\vec{a} \vec{e}_1 \vec{e}_3|} = 0$$

$y = z = 0$ is not possible.

*** 0

$$\begin{pmatrix} * \\ * \\ * \end{pmatrix}$$

OR $\begin{pmatrix} 0 \\ * \\ * \end{pmatrix}$

OR $\begin{pmatrix} 0 \\ 0 \\ * \end{pmatrix}$

$$\downarrow$$

$$\begin{pmatrix} * \\ 0 \\ 0 \end{pmatrix}$$

det is 0

$$\begin{pmatrix} * \\ * \\ * \end{pmatrix} \rightarrow \begin{pmatrix} * \\ 0 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} * \\ 0 \\ 0 \end{pmatrix}$$

det is (-1) times

$$\begin{pmatrix} * \\ 0 \\ 0 \end{pmatrix} \rightarrow \begin{pmatrix} * \\ 0 \\ 0 \end{pmatrix}$$

$$\vec{a} \neq \vec{0}$$

$$e_{11}x + *_{1}y + *_{2}z = 0$$

$$A \rightarrow \dots \rightarrow B = \left(\begin{array}{c|cc} e_{11} & *_{1} & *_{2} \\ \hline 0 & & \\ 0 & & \end{array} \right)$$

$$e_{11} \neq 0$$

$$\det(C) = 0$$

$$A\vec{u} = \vec{0} \Leftrightarrow B\vec{u} = \vec{0}$$

$$C \begin{pmatrix} y_0 \\ z_0 \end{pmatrix} = \vec{0} \quad \begin{pmatrix} y_0 \\ z_0 \end{pmatrix} \neq \vec{0}$$

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$$x_0 = -\frac{1}{e_{11}} (*_{1}y_0 + *_{2}z_0)$$

$$B \underbrace{\begin{pmatrix} x_0 \\ y_0 \\ z_0 \end{pmatrix}}_{\neq \vec{0}} = \begin{pmatrix} x_0 e_{11} + *_{1}y_0 + *_{2}z_0 \\ C \begin{pmatrix} y_0 \\ z_0 \end{pmatrix} \end{pmatrix} = \vec{0}$$

ce que l'on a montré.

$$\det(A) = 0$$

$$\Rightarrow \exists \vec{u} \neq \vec{0} \text{ tel que}$$

$$A\vec{u} = \vec{0}$$

on a

$$(A\vec{u} = \vec{0} \Rightarrow \vec{u} = \vec{0})$$

$$\Rightarrow \det(A) \neq 0.$$

$$\det(A) \neq 0 \Rightarrow (A\vec{u} = \vec{0} \Rightarrow \vec{u} = \vec{0})$$

pour x=11 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

← ← ← ১১৪-১১০ 'উই'.

$$A: \mathbb{R}^{2 \times 1} \Rightarrow \det(A) \neq 0$$



$$(A\vec{v} = \vec{0} \Rightarrow \vec{v} = \vec{0})$$

$$B = \begin{pmatrix} 1 & 2 & 3 \\ 0 & 4 & 0 \\ 0 & 5 & 6 \end{pmatrix}$$

$$I_3 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(1) $\det(\lambda I_3 - B)$ এর মান

(2) $\det(\lambda I_3 - B) = 0$ এর সমাধান λ এর মান

$$(\lambda I_3 - B) \vec{v} = \vec{0}$$

এর সমাধান