Vector 向量.

$$\vec{A} = A_x \hat{e}_x + A_y \hat{e}_y + A_z \hat{e}_z$$
$$= A_1 \hat{e}_1 + A_2 \hat{e}_2 + A_3 \hat{e}_3$$
$$= A_1 \hat{i} + A_2 \hat{j} + A_3 \hat{k}$$

$$\vec{B} = B_1 \hat{e}_1 + B_2 \hat{e}_2 + B_3 \hat{e}_3$$

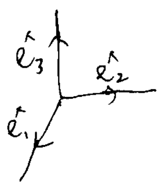
$$\vec{A} \cdot \vec{B} = |\vec{A}|\,|\vec{B}| \cos\theta = A_1B_1 + A_2B_2 + A_3B_3$$

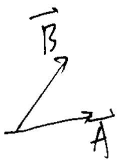
$$\begin{aligned} \hat{e}_1 \cdot \hat{e}_1 &= 1 \\ \hat{e}_1 \cdot \hat{e}_2 &= 0 \end{aligned} \Rightarrow \hat{e}_i \cdot \hat{e}_j = \delta_{ij} = \begin{cases} 1 & \text{if } i = j \\ 0 & \text{if } i \neq j \end{cases}$$

$$\vec{A} \times \vec{B} = (|\vec{A}|\,|\vec{B}| \sin\theta)\,\hat{n} = -\vec{B} \times \vec{A}$$

$$\hat{e}_1 \times \hat{e}_1 = 0 \qquad \hat{e}_i \times \hat{e}_j = \sum_{k=1}^{3} \epsilon_{ijk}\, \hat{e}_k$$

$$\hat{e}_1 \times \hat{e}_2 = \hat{e}_3$$




$$\epsilon_{ijk} = -\epsilon_{jik} = -\epsilon_{kji} = -\epsilon_{ikj}$$

$$\epsilon_{123} = 1 \qquad \epsilon_{213} = -1 \qquad \epsilon_{231} = 1$$

$$\epsilon_{123} = \epsilon_{231} = \epsilon_{312}$$

$$\vec{A} \times \vec{B} = (A_2B_3 - A_3B_2)\,\hat{e}_1 + (A_3B_1 - A_1B_3)\,\hat{e}_2 + (A_1B_2 - A_2B_1)\,\hat{e}_3$$

1×3矩陣

$$[B_1, B_2, B_3] \begin{bmatrix} A_1 \\ A_2 \\ A_3 \end{bmatrix} = B_1A_1 + B_2A_2 + B_3A_3 = \vec{B} \cdot \vec{A}$$

3×1矩陣

$n \times m$ 矩陣

$$\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1m} \\ a_{21} & a_{22} & \cdots & a_{2m} \\ \vdots & & & \\ a_{n1} & a_{n2} & \cdots & a_{nm} \end{bmatrix}$$

矩陣 matrix

$$\underset{A}{\overset{2\times 3}{\begin{bmatrix} 1 & 2 & 1 \\ 0 & 3 & 2 \end{bmatrix}}} \underset{B}{\overset{3\times 1}{\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}}} = \overset{2\times 1}{\begin{bmatrix} 1\times 1 + 2\times 2 + 1\times 1 \\ 0\times 1 + 3\times 2 + 2\times 1 \end{bmatrix}} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$$

$$AA^{-1} = A^{-1}A = I = \begin{bmatrix} 1 & & & 0 \\ & 1 & & \\ & & 1 & \\ 0 & & & \ddots \\ & & & & 1 \end{bmatrix}$$

$$IA = AI = A$$

反矩陣

$$AX = C \Rightarrow A^{-1}AX = A^{-1}C \Rightarrow X = A^{-1}C$$