Linear Algebra

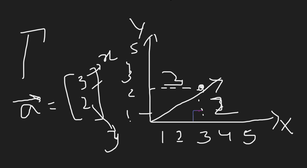
Today Topics

* vector
* operations

$\vec{a} = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$ x, y, z

2D

$\vec{a} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$



Length of vector

n-dims $\Rightarrow$ $\|a\| = \sqrt{a_1^2 + a_2^2 + \cdots + a_n^2}$

$\vec{a} = \sqrt{}$

$h^2 = 5^2 + 5^2$

$h^2 = 3^2 + 2^2$

$h^2 = 9 + 5$

$h^2 = 14$

$h = \sqrt{14}$

$\boxed{h = 2.17}$

operations

(1) Addition

Ex

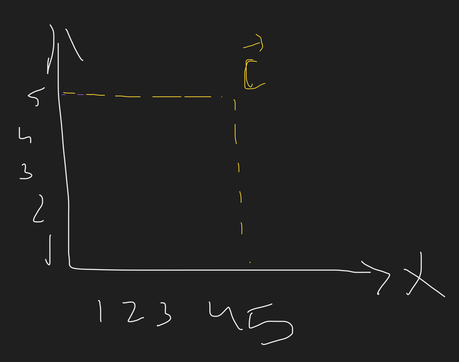
$\vec{a} = \begin{bmatrix} 2 \\ 3 \end{bmatrix}, \vec{b} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$

$\vec{c} = \vec{a} + \vec{b}$

$\vec{c} = \begin{bmatrix} 2 \\ 3 \end{bmatrix} + \begin{bmatrix} 3 \\ 2 \end{bmatrix}$

$\vec{c} = \begin{bmatrix} 2+3 \\ 3+2 \end{bmatrix} = \begin{bmatrix} 5 \\ 5 \end{bmatrix}$

graphical method

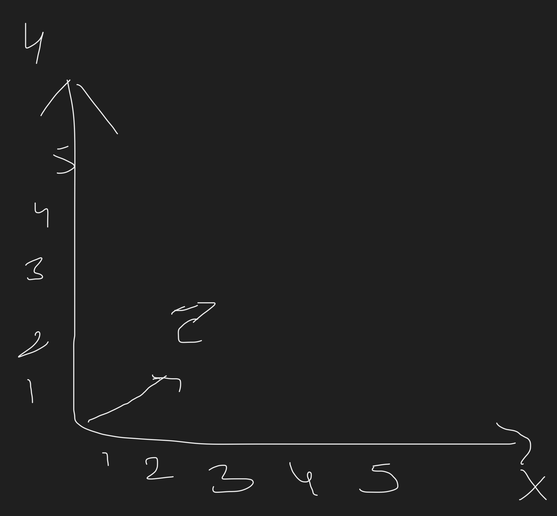


(2) Substration

$\vec{a} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}, \vec{b} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

$\vec{c} = \vec{a} - \vec{b}$

$\vec{c} = \begin{bmatrix} 3-1 \\ 2-1 \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$ x, y



(3) Vector scale multiplication

$(a \cdot \vec{b})$ vector, scalar

$a = 2 \qquad \vec{b} = \begin{bmatrix} 4 \\ 3 \end{bmatrix}$

$\vec{c} = a\vec{b}$

$\vec{c} = 2\begin{bmatrix} 4 \\ 3 \end{bmatrix} = \begin{bmatrix} 8 \\ 6 \end{bmatrix}$

$\vec{A} \cdot \vec{B} = \vec{B} \cdot \vec{A}$

$\vec{A} \times \vec{B} = \vec{B} \times \vec{A}$