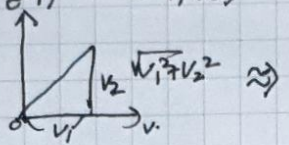
제 2장 norm과 dot product

① norm(벡터의 길이) $V=(v_1, v_2)$

$\|V\| = \sqrt{v_1^2+v_2^2}$



$\Rightarrow$ $v=(v_1, v_2 \cdots v_n)$

$\|V\| = \left(\sum_{k=1}^{n} v_k^2\right)^{\frac{1}{2}}$

② norm의 성질

- $\|V\| \geq 0$
- $\|V\| \Leftrightarrow V=\vec{0}$
- $\|kV\| = |k|\|V\|$

③ unit vector : 단위벡터

↳ 길이가 1인 벡터

$\frac{1}{\|V\|} \cdot V$ ex) (1,0), (0,1) 3차원 (1,0,0), (0,1,0), (0,0,1)

↳ standard unit vector

④ 거리

$V_1=(x_1, y_1)$

$V_2=(x_2, y_2)$

$\Rightarrow \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

↓ norm

$\|V_2-V_1\| = \|(x_2-x_1, y_2-y_1)\|$

⑤ Dot Product

$V_1 \cdot V_2$ = 스칼라.

$V_1=(x_1, y_1)$, $V_2=(x_2, y_2)$

$(x_1, y_1)\cdot(x_2, y_2) = x_1 \cdot x_2 + y_1 y_2$

⑥ 연산법칙

- 교환법칙: $V_1 \cdot V_2 = V_2 \cdot V_1$
- 분배법칙: $U\cdot(V_1+W) = UV_1+UW$
- 스칼라 배:

$K(U\cdot V) = (KU)\cdot V = U(K\cdot V)$

- 제곱

$V\cdot V \geq 0$.

$V=(v_1, v_2)$ $V\cdot V = (v_1\cdot v_1 + v_2\cdot v_2)$

$\overset{a}{=} (v_1^2+v_2^2) \geq 0$.

$\sqrt{V\cdot V} = \sqrt{v_1^2+v_2^2}$

$= \|V\|$