NO.

Linearity ; $f(x)$ → function, operation.

1) superposition $f(x_1+x_2) = f(x_1) + f(x_2)$

2) homogeneity $f(ax) = a f(x)$.

eg. $y = mx + n$ ($\rightarrow n=0,\ m \neq 0$)

- differentiation

$$\frac{d}{dt}\left(x_1(t) + x_2(t)\right) = \frac{d}{dt}x_1(t) + \frac{d}{dt}x_2(t).$$

- integration.

$$\int x_1(t) + x_2(t)\, dt = \int x_1(t)\, dt + \int x_2(t)\, dt$$

- matrix operation. (multiplication)

$$A(X_1 + X_2) = AX_1 + AX_2.$$

Vector operation.

HANYANG UNIVERSITY 한양 1939

MOOKHK CC BY NC ND

⊙ Basic Notation of Matrices

- vector $v = (a, b, c)$, $w = (a_2, b_2, c_2)$

  ↳ columns of a matrix. $= \begin{bmatrix} a_1 & a_2 \\ b_1 & b_2 \\ c_1 & c_2 \end{bmatrix}$

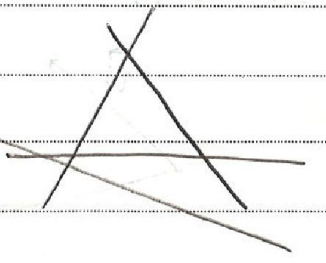
vector → matrix 2개

- Linear Combinations $\alpha v + \beta w$.

$$\Rightarrow \begin{bmatrix} a_1 & a_2 \\ b_1 & b_2 \\ c_1 & c_2 \end{bmatrix} \begin{bmatrix} \alpha \\ \beta \end{bmatrix} \Leftarrow \alpha \begin{bmatrix} a_1 \\ b_1 \\ c_1 \end{bmatrix} + \beta \begin{bmatrix} a_2 \\ b_2 \\ c_2 \end{bmatrix}$$

- central ideas (terms)
  - column space : all combinations of the columns
  - row space : " " rows
  - rank : # of independent columns (or rows)
  - elimination : to find the rank of a matrix.

~~⊙ Singular Case → not-unique solution. ⇒ no solution or infinite solu.~~
~~→ parallel lines and planes.~~
~~→ no intersection of 3 planes.~~
row picture → ~~line of intersection.~~



HANYANG UNIVERSITY 1939