Meckes, Meckes - Linear Algebra

Ex: Is $(2,3)$ a solution to the system

$$\begin{aligned} 3x - 2y &= 7 \\ x + 4y &= 9 \end{aligned} \quad ?$$

$$3(2) - 2(3) \stackrel{?}{=} 7$$

$$0 \neq 7$$

No.

Ex: An eigenvector of A is a nonzero vector v such that $Av = \lambda v$ for some scalar λ.

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \qquad \vec{v} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

Is $\vec{v}$ an eigenvector of A? No.

because $Av = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \underbrace{\begin{bmatrix} 0 \\ 1 \end{bmatrix}}_{v} = \underbrace{\begin{bmatrix} 2 \\ 4 \end{bmatrix}}_{Av} \neq \lambda \begin{bmatrix} 0 \\ 1 \end{bmatrix}$

for any scalar λ.

Is (object) a (thing)?

- Is the set linearly independent?
- Is the set a basis for subspace
- Is the matrix invertible?
- Is the set a subspace?
- Is the function a linear transformation?

Technical terms

MEMORIZE the definitions.

- Is f continuous at $x=3$?

$$\lim_{x \to 3} f(x) = f(3)$$