

Section 2.3: Spanning Sets

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5:02 PM

and Linear Independence

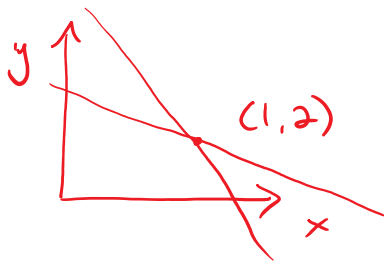
Theorem: A system of linear equations $[A \mid \vec{b}]$ is consistent if and only if \vec{b} is a linear combination of the columns of A .

→ unique or infinitely many solutions

Two Geometric Interpretations of Linear Systems:

consider
$$\begin{cases} 3x + y = 5 \\ x + 4y = 9 \end{cases}$$
 has solution $(1, 2)$

row interpretation: two lines



column interpretation:

$$x \begin{bmatrix} 3 \\ 1 \end{bmatrix} + y \begin{bmatrix} 1 \\ 4 \end{bmatrix} = \begin{bmatrix} 5 \\ 9 \end{bmatrix}$$

\vec{v}_1 \vec{v}_2 \vec{b}

