Linear algebra for AI & ML

$Ax = b$

Left inverse: Any matrix C is called a left inverse of A if $CA = I$

$Ax = b$ $\quad A \in \mathbb{R}^{m \times n}$, $b \in \mathbb{R}^{m}$

Let C be a left inverse of A.

$$Cb = C(Ax) = (CA)x = x$$

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}, \quad b = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$$

$$C = A^T, \quad Cb = A^T b = \begin{bmatrix} 0 \\ 1 \end{bmatrix} = x$$

$A \in \mathbb{R}^{m \times n}$, $b \in \mathbb{R}^{m}$

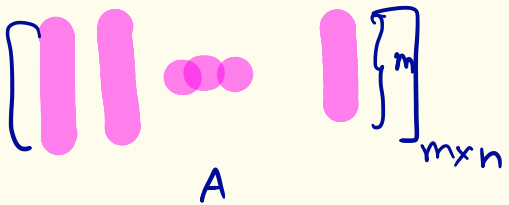
A is right invertible. Let D be a right inverse.

$$AD = I_{m \times m}$$

$$\boxed{Ax = b}$$

Let $x = Db$

$$Ax = A(Db) = (AD)b = b$$



$\subseteq \mathbb{R}^{m}$

$$\begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$