

DOES

$$\begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} a \\ b \end{bmatrix}$$

HAVE A UNIQUE  
SOLN. FOR

ALL  $a, b$  IN  $\mathbb{R}$

IF  $A$  HAS A UNIQUE  
SOLN. FOR ALL  $a, b$  IN  $\mathbb{R}$ ,

- 1)  $\det A \neq 0$
- 2)  $A$  IS INVERTIBLE

IF  $A$  IS INVERTIBLE...

$$\begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x_{11} & x_{12} \\ x_{21} & x_{22} \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$A A^{-1} = I$$

$$Ax = b$$

IS THERE  $x_{11}, \dots, x_{22}$   
SUCH THAT THIS IS TRUE?

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

$$\Downarrow R_1 - R_2 = R_1$$

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

$$\rightarrow \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} x = \begin{bmatrix} 1 & 0 \\ -1 & 0 \end{bmatrix}$$

$$x_{12} = 1$$

$A$  IS NOT  
INVERTIBLE

$$x_{11}, x_{21}, x_{22} = ?$$

NO UNIQUE  
SOLUTION EXCEPT  
FOR THE SYSTEM

B.S. PHYSICS  
MINORS IN,  
CHEMISTRY  
& MATHEMATICS