Recall:

Consider the system of equations

A\$\frac{1}{2}\$

Dook for least Equared Solutions

A\$\frac{1}{2}\$

According to the system of equations of solution exists.

A\$\frac{1}{2}\$

According to the system of equations of solutions of solutions and solutions.

A\$\frac{1}{2}\$

A\$\frac{1}{2}\$

According to the system of equations of solutions of solutions.

A\$\frac{1}{2}\$

A\$\frac{1}{2}\$

A\$\frac{1}{2}\$

According to the system of equations of solutions.

A\$\frac{1}{2}\$

A\$

Solveng Ax = b is basically

finding out the value of

Scalars Y_1, \ldots, X_n 8.t

To can be expressed as

a l.c. of cols of A

If we can find Scalars $\chi_1, \chi_2 \dots \chi_n$,

then $b = \chi_1 A_1 + \dots + \chi_n A_n$ $\Rightarrow b \in Col Space of A$.

If we cannot find scalars $\chi_1 \dots \chi_n$, then $b \notin col Sp(A)$.

How do we know if a $2x_1 + x_2 = b_1$ $2x_1 + x_2 = b_2$ Given System of eqns is

Consistent or not?

Ex 1: $2x_1 + x_2 = 3$ 3 • RREf $2x_1 + x_2 = 4$ 3 • Ref $2x_1 + x_2 = 4$ 3 • Ref $2x_1 + x_2 = 4$ 3 • Roonsistent Sys. a no Soln exists.

For Solutions to exist for the given example $b_2 - b_1 = 0$.

Look at: $A^{T}y = 0$ $\begin{bmatrix} 2 & 2 & | y_1 & | = 0 \\ 1 & 1 & | y_2 & | = 0 \end{bmatrix}$ RREF; $b_1 - b_2 = 0$

$$\begin{bmatrix} 2 & 2 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$y_2 = t \Rightarrow y_1 = -t.$$

$$(y_1) = (t) = \begin{cases} t \\ -t \end{cases} = \begin{cases} t(1), & t \in \mathbb{R} \end{cases}$$

$$|b_{2} - |b_{1} = 0| = b_{1} - b_{2} = 0$$

$$= [1] \cdot [b_{1}] = b_{1} - b_{2} = 0.$$

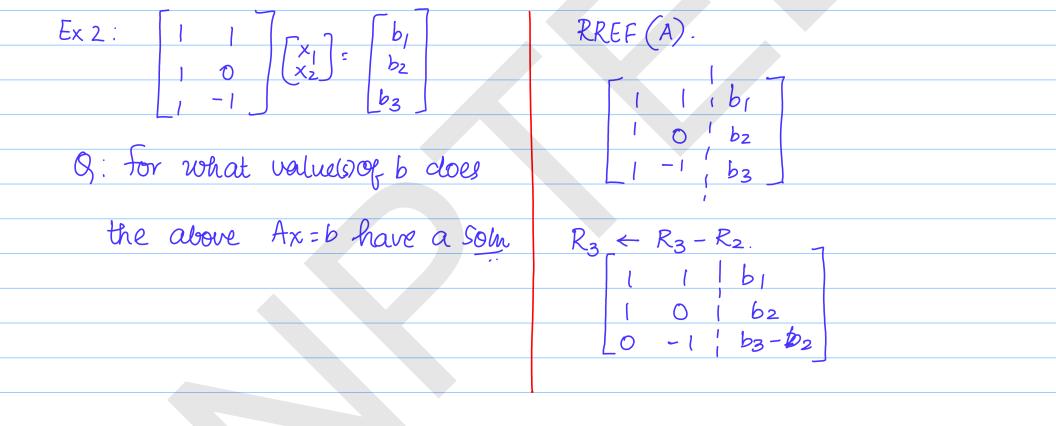
$$|b_{2}| = b_{1} - b_{2} = 0.$$

$$|b_{2}| + b_{2}| = b_{1} - b_{2} = 0.$$

$$|b_{2}| + b_{2}| = b_{1} - b_{2} = 0.$$

$$|b_{1}| + b_{2}| = b_{1} - b_{2} = 0.$$

$$|b_{2}| + b_{2}| = b_{1} - b_{2} = 0.$$



 $R_2 \leftarrow R_2 - R_1$ R3 - R3- R2.

$$y_1 + y_2 + y_3 = 0$$

$$\begin{bmatrix} y_1 \\ y_2 \\ -2t \\ t \end{bmatrix} = \begin{cases} t \\ -2t \\ t \end{cases} = \begin{cases} t \\ -2 \\ t \end{cases}, t \in \mathbb{R} \end{cases}$$

$$\begin{array}{c|c}
 & b_1 \\
b_2 \\
b_3
\end{array} \quad \begin{array}{c}
 & 1 \\
-2 \\
1
\end{array} = 0$$

CONSISTENCY CONDITION:

then

Ax = b will have

Solution!