Echelon Form

Objectives:

- 1. Layout Echelon forms
- 2. Underdetermined zud overdetermined systems

General form of Linear Systems

Consider the system of m linear equations with n variables x1, x2, ..., xn in general form:

$$\partial_{11} \times_{1} + \partial_{12} \times_{2} + \dots + \partial_{1n} \times_{n} = b_{1}$$

$$\partial_{21} \times_{1} + \partial_{22} \times_{2} + \dots + \partial_{2n} \times_{n} = b_{2}$$

$$\vdots$$

$$\partial_{m_{1}} \times_{1} + \partial_{m_{2}} \times_{2} + \dots + \partial_{m_{n}} \times_{n} = b_{m}$$

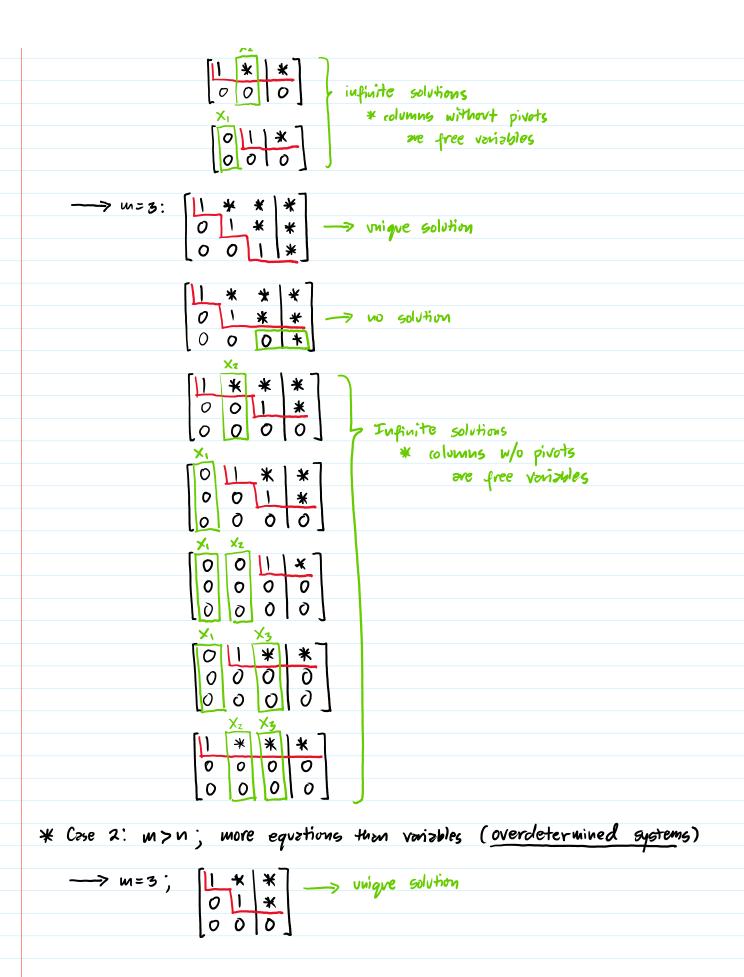
where aij and bi are constants for i f {1,2,..., m} and j f {1,2,..., n}.

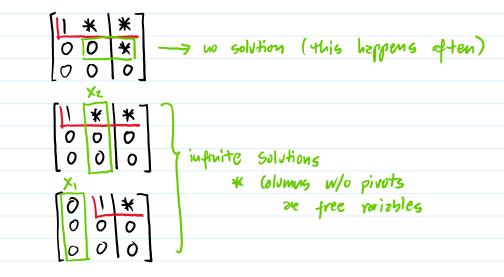
General form of Avgmented Matrices

$$\begin{bmatrix} \partial_{11} & \partial_{12} & \cdots & \partial_{1M} & b_{1} \\ \partial_{21} & \partial_{22} & \cdots & \partial_{2M} & b_{2} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ \partial_{m1} & \partial_{m2} & \cdots & \partial_{mM} & b_{m} \end{bmatrix}$$

Row Echelon Forms (Exemples & non-exhaustive)

* Row eduction forms are the end goal of Gaussian elimination of augmented matrices.





* Cose 3: m<n; more variables than equations (underdetermined systems)

No unique solutions for underdetermined systems

* Summary: Row echelon form is a way of arranging a

matrix so that each nonzero row starts

with a leading entry (1st non-zero number)

that is to the right of the leading entry

in the now above, and all rows of zeros

are placed at the bottom.

A pivot is one of these leading entries that

anchors a now and helps determine the

stucture of the solution set.