Linear Algebra (MIT 18.06 Spring 2005) Notes

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1 The Geometry of Linear Equations

We consider the case where we have n linear equations with n unknowns. This linear equations can be seen from three differents views

- Row Picture
- Column Picture
- Matrix Form

Now lets consider the following example in two dimensions :

$$\begin{cases} 2x - y = 0 & \text{(1a)} \\ -x + 2y = 3 & \text{(1b)} \end{cases}$$

Which can be put in the matrix form:

$$AX = b \tag{2}$$

$$\begin{bmatrix} 2 & 1 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 3 \end{bmatrix} \tag{3}$$

The idea is to solve this example and step back to see the biggest picture of Linear Algebra

1.1 Row Picture

We take one row at a time and we plot the points that satisfy the rows. Is't often good to start we the horizontal line.

Points in the plan that satisfy (1a) and (1b)