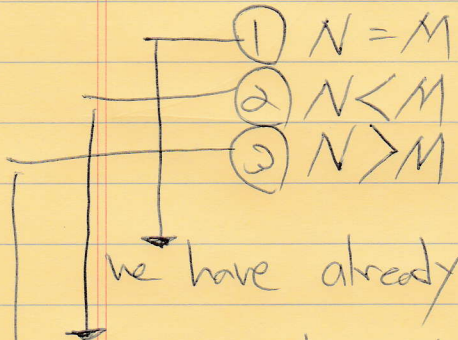
2019/10/21

- Previously, we only considered a case that the random variables' number and the equations' number are same.

- What if both are different?
  - There will be 3 cases that we could consider.
    (N = number of equations, M = number of random variables)



  - we have already talked about this.

In ② case, it will have infinite number of solutions since the number of equations is greater than number of variables.

- Example) $x_1 + x_2 = 2$
  $x_2 + x_3 = 2$
- It has "~~two~~ three random variables" and "two equations".
- $x_1 = 2 - x_2$
  $x_3 = 2 - x_2$
  $\Rightarrow \boxed{x_1 = x_3 = 2 - x_2}$
- There fore, it could have infinite number of solutions.

$$x = \begin{bmatrix} 2 \\ 0 \\ 2 \end{bmatrix}, \quad x = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \quad x = \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix}, \quad \cdots$$

In ③ Case, it might have no solutions.

- Example)
$$\left.\begin{aligned} x_1 + x_2 &= 2 \\ x_2 + x_3 &= 2 \\ x_1 + x_2 + x_3 &= 3 \\ x_1 + x_2 + 2x_3 &= 5 \end{aligned}\right\} \Rightarrow$$

$x_1 + x_2 = x_3$ "doesn't satisfy"