Mo Tu We Th Fr Sa Su

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Session 13: Linear Systems of Equations 2025.6.8

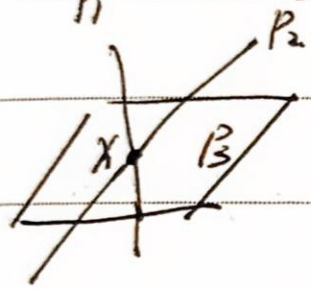
3×3 liner systerm

$$\begin{cases} x + z = 1 \\ x + y = 2 \\ x + 2y + 3z = 3 \end{cases}$$

two planes intersect in a line

$P_1 \cap P_2$

$AX = B$, $X = A^{-1}B$



① if P_1, P_2 in plane

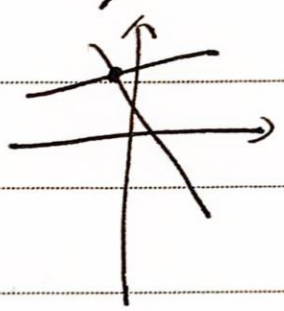
any point is the solution

is ② if $P_1 \cap P_2$ is parallel to P_3,

no-solution

Geometry of linear systems of equations

$$\begin{cases} x + 2y = 4 \\ 6x + 5y = 6 \end{cases}$$



the intersect is the solution

3×3 system

$$\left.\begin{aligned} 6x + 5y + 3z &= 1 \\ x + 2y + z &= 4 \\ 2x - 2y - 2z &= 8 \end{aligned}\right\}$$ the intersection of three plane

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there are four possibilities.

1. intersect in a point (1 solution)
2. Intersect in a line (∞ solutions)
3. Intersect in a plane (∞ solutions)
4. 0 solution
   a) planes all parallel
   b) two planes are parallel
   c) intersection of each pair are parallel ✗

Problems:

1.

a) $\begin{cases} x+y+z=0 \\ x+y+z=1 \\ x+y+z=2 \end{cases}$ all parallel

b) $\begin{cases} x+y+z=0 \\ x+y+z=1 \\ x+2y+3z=0 \end{cases}$ two parallel

c) $\begin{cases} x+y+z=0 \\ x+y+2z=0 \\ x+y+3z=0 \end{cases}$ $\begin{cases} x=0 \\ y=0 \\ x+y=0 \end{cases}$ intersect in a line