6.2 System of Linear Equations in Three Variables

System of Linear equations in three variables

➢ Elimination Method

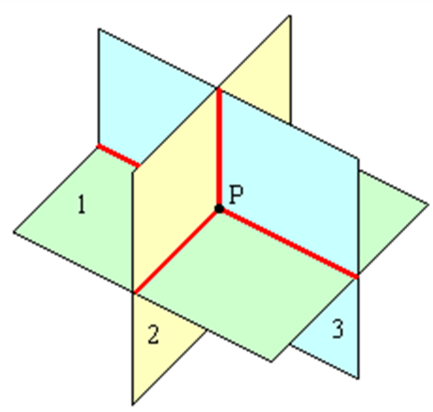
Steps: 1. Work with equations (1) and (2) to eliminate one variable, the new equation will be (4)
2. Work with equations (1) and (3) to eliminate the same variable, the new equation will be (5)
3. Work with equations (4) and (5) to eliminate a second variable the new equation will be (6).
4. Solve for the remaining variable.
5. Plug that value into equation (4) and solve for the second variable.
6. Plug those 2 values into equation (1) and solve for the 3rd variable.
7. Write your answer in the form (x, y, z)

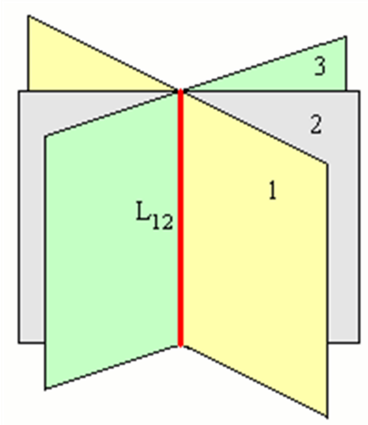
Ex: $x - 2y + z = 7$
$2x + y - z = 0$
$3x + 2y - 2z = -2$

Examples:

1. $\begin{Bmatrix} x - 3y + 4z = -6 \\ 2x + 2y - 3z = 18 \\ 3x - y + 2z = 10 \end{Bmatrix}$

2. $\begin{Bmatrix} 2x + y - z = -2 \\ 3x + 2y + 3z = 21 \\ 7x + 4y + z = 17 \end{Bmatrix}$





Non-square System of Equations

If the number of equations is less than the number of variables this is considered a non-square system of equations.

The system has either **no solution** or **infinite solutions**.

Examples:

1. $\begin{Bmatrix} 4x - 2y + 6z = 5 \\ 2x - y + 3z = 2 \end{Bmatrix}$