Fixação Sistemas

a) $\begin{cases} 3x - 2y = 3 \\ x - y = -1 \end{cases}$

$\Delta = \begin{vmatrix} 3 & -2 \\ 1 & -1 \end{vmatrix}$ $\quad \Delta x = \begin{vmatrix} 3 & -2 \\ -1 & -1 \end{vmatrix}$ $\quad \Delta y = \begin{vmatrix} 3 & 3 \\ 1 & -1 \end{vmatrix}$

$\Delta = -3 + 2$ $\quad \Delta x = -3 - 2$ $\quad \Delta y = -3 - 3$

$\Delta = -1$ $\quad \Delta x = -5$ $\quad \Delta y = -6$

$x = \frac{\Delta x}{\Delta} = \frac{-5}{-1} = 5$ $\quad y = \frac{\Delta y}{\Delta} = \frac{-6}{-1} = 6$

$S = \{(5, 6)\}$

b) $\begin{cases} 5x - 3y = 13 \\ 4x + 6y = 2 \end{cases}$

$\Delta = \begin{vmatrix} 5 & -3 \\ 4 & 6 \end{vmatrix}$ $\quad \Delta x = \begin{vmatrix} 13 & -3 \\ 2 & 6 \end{vmatrix}$ $\quad \Delta y = \begin{vmatrix} 5 & 13 \\ 4 & 2 \end{vmatrix}$

$\Delta = 30 + 12$ $\quad \Delta x = 78 + 6$ $\quad \Delta y = 10 - 52$

$\Delta = 42$ $\quad \Delta x = 84$ $\quad \Delta y = -42$

$x = \frac{84}{42} = 2$ $\quad y = -\frac{42}{42} = -1$

$S = \{(2, -1)\}$

c) $\begin{cases} x+y+z=0 \\ 2x-2y+z=-3 \\ 3x+y-2z=21 \end{cases}$

$$\Delta = \begin{vmatrix} 1 & 1 & 1 \\ 2 & -2 & 1 \\ 3 & 1 & -2 \end{vmatrix}$$

$\Delta = 18$

$$\Delta x = \begin{vmatrix} 0 & 1 & 1 \\ -3 & -2 & 1 \\ 21 & 1 & -2 \end{vmatrix} \quad \Delta y = \begin{vmatrix} 1 & 0 & 1 \\ 2 & -3 & 1 \\ 3 & 21 & -2 \end{vmatrix} \quad \Delta z = \begin{vmatrix} 1 & 1 & 0 \\ 2 & -2 & -3 \\ 3 & 1 & 21 \end{vmatrix}$$

$\Delta x = 54$ $\quad \Delta y = 36$ $\quad \Delta z = -90$

$x = \frac{54}{18} = 3$ $\quad y = \frac{36}{18} = 2$ $\quad z = \frac{-90}{18} = -5$

$S = \{(3, 2, -5)\}$

d) $\begin{cases} x+2y+3z=6 \\ 2x-3y+z=0 \\ x+y-2z=4 \end{cases}$

$$\Delta = \begin{vmatrix} 1 & 2 & 3 \\ 2 & -3 & 1 \\ 1 & 1 & -2 \end{vmatrix}$$

$\Delta = 30$

$$\Delta x = \begin{vmatrix} 6 & 2 & 3 \\ 0 & -3 & 1 \\ 4 & 1 & -2 \end{vmatrix} \quad \Delta y = \begin{vmatrix} 1 & 6 & 3 \\ 2 & 0 & 1 \\ 1 & 4 & -2 \end{vmatrix} \quad \Delta z = \begin{vmatrix} 1 & 2 & 6 \\ 2 & -3 & 0 \\ 1 & 1 & 4 \end{vmatrix}$$

$\Delta x = 74$ $\quad \Delta y = 50$ $\quad \Delta z = 2$

$x = \frac{74}{30} = \frac{37}{15}$ $\quad y = \frac{50}{30} = \frac{5}{3}$ $\quad z = \frac{2}{30} = \frac{1}{15}$

$S = \left\{\left(\frac{37}{15}, \frac{5}{3}, \frac{1}{15}\right)\right\}$

II Escalonamento

a) $\begin{cases} 2x - 3y - z = 4 \\ x + 2y + z = 3 \\ 3x - y - 2z = 1 \end{cases}$

① $\times -2$ + ② ① $\times -3$ + ③

$\begin{cases} x + 2y + z = 3 & ① \\ 7y + 3z = 2 & ② \\ -7y - 5z = -8 & ③ \end{cases}$

$-2x - 4y - 2z = -6$
$2x - 3y - z = 4$
$-7y - 3z = -2 \ (-1)$

$\begin{cases} x + 2y + z = 3 \\ 7y + 5z = 2 \\ z = 3 \end{cases}$

$-3x - 6y - 3z = -9$
$3x - y - 2z = 1$
$-7y - 5z = -8$

↳ O sistema está escalonado!

② + ③ $7y + 3z = 2$
$-7y - 5z = -8$
$-2z = -6$
$\boxed{z = 3}$

$7y + 3z = 2$
$7y + 3(3) = 2$
$7y = 2 - 9$
$\boxed{y = \frac{-7}{7} = -1}$

$x + 2y + z = 3$
$x - 2 + 3 = 3$
$\boxed{x = 2}$

SPD
$S = \{(2, -1, 3)\}$

II

b) $\begin{cases} x + y + z = 1 \\ x + y + 2z = 3 \\ x + y + z = 2 \end{cases}$ (-1) ×

① ② → ① + ② $x + y + z = 1$
$-x - y - z = -2$

$x + y + 2z = 3$

$0 = -1$

↳ como $0 = -1$ é impossível, temos:

SI $S = \emptyset$