Tarefa Básica

① $\begin{cases} ax+4y=1 \\ x+2y=b \end{cases}$ $D=\begin{vmatrix} a & 4 \\ 1 & 2 \end{vmatrix} = 2a-4$

$4 \qquad 2a$

$a=2=0$

$b=\frac{1}{2}=0$

$D_x=\begin{vmatrix} 1 & 4 \\ b & 2 \end{vmatrix} = 2-4b$

$4b \qquad 2$

$\frac{D_x}{D} = \frac{2a-4}{2-4b} = \frac{0}{0}$

$D \neq 0 \rightarrow$ SPD

$D = 0 \rightarrow$ SPI ou SI

$D_x=0 \quad D_x \neq 0$

$D_y=0 \quad D_y \neq 0$

② $\begin{cases} x+ky=1 \\ kx+y=1-k \end{cases}$ $-k$ $\begin{pmatrix} 1 & k & : & 1 \\ k & 1 & : & 1-k \end{pmatrix}$ $\begin{pmatrix} & & & \\ 0 & -k^2+1 & : & -2k+1 \end{pmatrix}$

$k=-1 \quad y=\frac{(-2k+1)}{0} \quad y=\frac{(-2k+1)}{(-k^2+1)}$

↑ SI ↑ $k \neq 1$ ou $k \neq -1$ SPD

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

a) $A=\begin{vmatrix} 1 & 2 & c & 1 & 2 \\ 0 & 1 & 1 & 0 & 1 \\ 3 & 2 & 2 & 3 & 2 \end{vmatrix}$ $3c+2+0$

$\det = 8-3c-2$

$\det = 6-3c$

$2+6+c$

b) $6-3c \neq 0$

$\frac{6}{-3} = c \rightarrow -2 = c$

④ $\begin{cases} x - y = k \\ 12x + ky + z = 1 \\ 36x + kz = 2 \end{cases}$

$$D = \begin{vmatrix} 1 & -1 & 0 \\ 12 & -k & 1 \\ 36 & 0 & k \end{vmatrix} \begin{matrix} 1 & -1 \\ 12 & -k \\ 36 & 0 \end{matrix}$$

$0 + 0 + (-12k) = -12k$

$-x^2 + (-36) + 0 = -x^2 - 36$

$\det = k^2 - 36 - 12k$

$D \neq 0 \rightsquigarrow -k^2 - 36 - 12k \quad (\cdot(-1))$

$k^2 + 12x + 36$

$S \quad P$

$6 \cdot 6 = 36 \rightarrow 6 + 6 = 12$

$6 + 6 = 12$

$6 \cdot 6 = 32$

$k \neq 6$

⑤ $\begin{cases} x - y - z = 6 \\ 2x + y - z = -3 \\ x + 2y - z = -5 \end{cases}$

$$\begin{matrix} \\ -1 \\ -2 \end{matrix} \begin{pmatrix} 1 & 1 & 1 & : & 6 \\ 2 & 1 & -1 & : & -3 \\ 1 & 2 & -1 & : & -5 \end{pmatrix} \sim \begin{pmatrix} 0 & 0 & 0 \end{pmatrix}$$

06) $\begin{cases} x+y+z=k \\ kx+y+z=1 \\ x+y-z=k \end{cases}$

$D = \begin{vmatrix} 1 & 1 & 1 \\ k & 1 & 1 \\ 1 & 1 & -1 \end{vmatrix}$ $\begin{matrix} 1+1+(-k) \\ -1+1+k \end{matrix}$ $\quad Det = 2k-2$

$K = 1$

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

$\begin{cases} x+y+z=1 \\ 0+0-2z=0 \end{cases} \rightsquigarrow x+y=1$

$z=0$ $\quad x=1-y$

$K=1$, SPI (D)

07) $\begin{cases} x+y+z=1 \\ mx-2y+4z=5 \\ m^2+4y+16z=25 \end{cases}$

$D = \begin{vmatrix} 1 & 1 & 1 \\ m & -2 & 4 \\ m^2 & 4 & 16 \end{vmatrix}$ $\begin{matrix} 2m^2+16+16m \\ -32+4m^2+4m \end{matrix}$ $\quad det = 6m^2-12m-48$

$\Delta = b^2-4.a.c$
$\Delta = 12^2-4.6.(-48)$
$\Delta = 144+1052$
$\Delta = 1296$
$\sqrt{\Delta} = 36$

$x = \frac{-b \pm \sqrt{\Delta}}{2.a}$

$x' = \frac{12+36}{2.6} = \frac{48}{12} = 4$ $\quad x'' = \frac{12-36}{12} = \frac{-24}{12} = -2$

Continuação exercício 7 - parte 1

$x' = 4$
$x'' = -2$

$(x'-x'') = 4-2 = 2$ //

Parte 2 - Tarefa Básica

① $\begin{bmatrix} 1 & 7 \\ 7 & 1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = k \cdot \begin{bmatrix} x \\ y \end{bmatrix}$ $\quad \begin{cases} x + 7y = kx \\ 7x + y = ky \end{cases}$

$D = \begin{vmatrix} 1 & 7 \\ 7 & 1 \end{vmatrix} = 1 - 49 = -48$

49 $\quad$ 1

$Dx = \begin{vmatrix} k & 7 \\ k & 1 \end{vmatrix} = k - 7k = -6k$

7k $\quad$ k

$-7 \quad \begin{pmatrix} 1 & 7 & : & k \\ 7 & 1 & : & k \end{pmatrix} \quad \begin{pmatrix} 0 & -48 & : & -6k \end{pmatrix}$

$\hookrightarrow z = -48 = 6k$

$D \neq 0 \rightarrow -48 \neq -6k$

$-48 = k$

$-6 \longrightarrow 8 = k$

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

$D = \begin{vmatrix} 3 & 4 & -1 \\ 2 & -1 & 3 \\ 1 & 1 & 0 \end{vmatrix}$ $\begin{matrix} 3 & 4 \\ 2 & -1 \\ 1 & 1 \end{matrix}$ $\quad 1 + 9 + 0 = 10$

$0 + 12 + (-2) = 10$

$\det = 10 - 10 = 0$

$Dx = \begin{vmatrix} 0 & 4 & -1 \\ 0 & -1 & 3 \\ 0 & 1 & 0 \end{vmatrix}$ $\begin{matrix} 0 & 4 \\ 0 & -1 \\ 0 & 1 \end{matrix}$ $\quad 0 + 0 + 0 = 0$

$0 + 0 + 0 = 0$

$\det x = 0$

$Dy = \begin{vmatrix} 3 & 0 & -1 \\ 2 & 0 & 3 \\ 1 & 0 & 0 \end{vmatrix}$ $\begin{matrix} 3 & 0 \\ 2 & 0 \\ 1 & 0 \end{matrix}$ $\quad 0 + 0 + 0 = 0$

$0 + 0 + 0 = 0$

$\det y = 0$

$0+0+0=0$

$$D_z=\begin{vmatrix}3&4&0\\2&-1&0\\1&1&0\end{vmatrix}\begin{matrix}3&4\\2&-1\\1&1\end{matrix}\qquad \det_z=0$$

$0+0+0=0$

$x=\frac{D_x}{D}=\frac{0}{0}$ $\quad y=\frac{D_y}{D}=\frac{0}{0}$ $\quad z=\frac{D_z}{D}=\frac{0}{0}$ SPI

③ $\begin{cases}x+y+z=0\\kx+3y+4z=0\\x+ky+3z=0\end{cases}$

$3+k+3k=3+7k$

$$D=\begin{vmatrix}1&1&1\\k&3&4\\1&k&3\end{vmatrix}\begin{matrix}1&1\\k&3\\1&k\end{matrix}$$

$9+4+k^2=13+k^2$

$13+k^2-3+7k$

$k^2+7k+10=0$

$2+5=7$

$2\cdot5=10$

Soma de k
$2+5=7$

④ $\begin{cases}x+kz=0\\kx+y=0\\x+kz=0\end{cases}$ $\quad D_x=0\ \begin{cases}1\,0\,k=0\\k\,1\,0=0\\1\,k\,0=0\end{cases}$ $\quad D_y=0$ $\quad D_z=0$

$k+0+0=k$

$$D=\begin{vmatrix}1&0&k\\k&1&0\\1&k&0\end{vmatrix}\begin{matrix}1&0\\k&1\\1&k\end{matrix}=k^3-k$$

$0+0+k^3=k^3$

k^3-k

$k(k-1)(k+1)=0$

$k=-1,\ k=0,\ k=1$

$k\neq0,\ k\neq1,\ k\neq-1$

$V=\{k\in\mathbb{R}\,/\,k\neq0,\ k\neq1,\ k\neq-1\}$

⑤ $\begin{cases} -x + 2y - 3 = 0 \\ 3x - y + 3 = 0 \\ 2x - 4y + 6 = 0 \end{cases}$

$-6+(-12)+36=18$

$D = \begin{vmatrix} -1 & 2 & -3 \\ 3 & -1 & 3 \\ 2 & -4 & 6 \end{vmatrix} \begin{matrix} -1 & 2 \\ 3 & -1 \\ 2 & -4 \end{matrix} = 54 - 18 = 36$

$D \neq 0 \rightarrow 36$

$6+12+36=54$