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D S T Q Q S S

TAREFA BASICA SISTEMAS LINEARES

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

$\begin{pmatrix} 2 & -1 \\ -3 & 3 \end{pmatrix}$

3 6

$D_x = 6 - 3 = 3$

$\begin{pmatrix} 2 & 2 \\ -1 & -3 \end{pmatrix}$

-2 -6

$\begin{pmatrix} 2 & -1 & : & 2 \\ -1 & 3 & : & -3 \end{pmatrix}$

-1 6

$DET = 6 + 1 = 5$

$D = 5$

$X = \frac{3}{5}$

$D_y = -6 + 2 = 4$

$y = \frac{4}{5}$

$V = \{(\frac{3}{5}, \frac{4}{5})\}$

(B) $\begin{cases} 3x - y + z = 1 \\ 2x + 3z = -1 \\ 4x + y + 2z = 7 \end{cases}$

$\begin{pmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & 2 \end{pmatrix}$

$\begin{pmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 1 & 1 & 2 \end{pmatrix}$

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

$\begin{pmatrix} 2 & -1 \\ -3 & 3 \end{pmatrix}$ $\begin{matrix} \\ \\ 3 \end{matrix}$ $\begin{matrix} \\ \\ 6 \end{matrix}$

$D_x = 6-3 = 3$

$\begin{pmatrix} 2 & 2 \\ -1 & -3 \end{pmatrix}$ $\begin{matrix} \\ \\ -2 \end{matrix}$ $\begin{matrix} \\ \\ -6 \end{matrix}$

$D_y = -6+2 = 4$

$\begin{pmatrix} 2 & -1 & : & 2 \\ -1 & 3 & : & -3 \end{pmatrix}$

-1 $\quad$ 6

$DET = 6+1 = 5$

$D = 5$

$X = \frac{3}{5}$

$Y = \frac{4}{5}$

$V = \{(\frac{3}{5}, \frac{4}{5})\}$

B $\begin{cases} 3x-y+z=1 \\ 2x+3z=-1 \\ 4x+y+2z=7 \end{cases}$

$\begin{pmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{pmatrix}$ $\begin{matrix} 3 & -1 \\ 2 & 0 \\ 4 & 1 \end{matrix}$

$0+9+4 = 13$

$D = -10-11 = -23$

$0-12+2 = -10$

$\begin{pmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 7 & 1 & -2 \end{pmatrix}$ $\begin{matrix} 1 & -1 \\ -1 & 0 \\ 7 & 1 \end{matrix}$

$0+3-2 = 1$

$D_x = -22-1 = -23$

$0-21-1 = -22$

$\begin{pmatrix} 3 & -1 & 1 \\ 2 & 0 & -1 \\ 4 & 1 & 7 \end{pmatrix}$ $\begin{matrix} 3 & -1 \\ 2 & 0 \\ 4 & 1 \end{matrix}$

$0-3-14 = -17$

$D_z = 6+17 = 23$

$\begin{pmatrix} 3 & 1 & 1 \\ 2 & -1 & 3 \\ 4 & 7 & 2 \end{pmatrix}$ $\begin{matrix} 3 & 1 \\ 2 & -1 \\ 4 & 7 \end{matrix}$

$-6+12+14+33$

$D_y = 72+55$

$D_y = -23$

$X = \frac{-23}{-23} = 1$

$Z = \frac{-23}{23} = -1$

$V = \{(1, 1, -1)\}$

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D S T Q Q S S

② $\begin{cases} 3x+4y-z=7 \\ 4x+5y+2z=12 \\ x-2y+3z=8 \end{cases}$

$\begin{pmatrix} 3 & 4 & -1 \\ 4 & 5 & 2 \\ 1 & -2 & 3 \end{pmatrix}$ $\begin{matrix} 3 & 4 \\ 4 & 5 \\ 1 & -2 \end{matrix}$

$-5-12+48=31$

$45+8+8=61$

$D=61-31=30$

$\begin{pmatrix} 3 & 7 & -1 \\ 4 & 12 & 2 \\ 1 & 8 & 3 \end{pmatrix}$ $\begin{matrix} 3 & 7 \\ 4 & 12 \\ 1 & 8 \end{matrix}$

$108+2-32=78$

$Dx=78-48=30$

$y=\frac{30}{30}=1$

ALTERNATIVA A

$2-33-6=-37$

③ $\begin{cases} x+2y+z=1 \\ 3x+y-11z=-2 \\ 2x+3y-z=1 \end{cases}$

$\begin{pmatrix} 1 & 2 & 1 \\ 3 & 1 & -11 \\ 2 & 3 & -1 \end{pmatrix}$ $\begin{matrix} 1 & 2 \\ 3 & 1 \\ 2 & 3 \end{matrix}$

$-1-44+9=-36$

$2-33+4=28$

$D=-36+37=1$

$\begin{pmatrix} 1 & 2 & 1 \\ -2 & 1 & -11 \\ 1 & 3 & -1 \end{pmatrix}$ $\begin{matrix} 1 & 2 \\ -2 & 1 \\ 1 & 3 \end{matrix}$

$-1-22-6=-29$

$Dx=-29+28=-1$

$x=\frac{-1}{-1}=1$

$-4-11-3=-18$

$\begin{pmatrix} 1 & 1 & 1 \\ 3 & -2 & -11 \\ 2 & 1 & -1 \end{pmatrix}$ $\begin{matrix} 1 & 1 \\ 3 & -2 \\ 2 & 1 \end{matrix}$

$2-22+3=-19$

$Dy=-18+19=1$

$y=\frac{1}{1}=1$

$2-6+6=2$

$z=\frac{0}{1}=0$

$\begin{pmatrix} 1 & 2 & 1 \\ 3 & 1 & -2 \\ 2 & 3 & 1 \end{pmatrix}$ $\begin{matrix} 1 & 2 \\ 3 & 1 \\ 2 & 3 \end{matrix}$

$Dz=2-2=0$

$x+y+z=0$

$-1+1+0=0$

ALTERNATIVA C

④ $\begin{cases} x+2y-3z=29 \\ x+3y-2z=4 \\ x-y-2z=8 \end{cases}$

$\begin{pmatrix} 1 & 2 & -3 \\ 1 & 3 & -2 \\ 1 & -1 & -2 \end{pmatrix} \begin{matrix} 1 & 2 \\ 1 & 3 \\ 1 & -1 \end{matrix}$

$-9+2-4 \qquad -6-4+3=-7$

$-9-2$

$-11 \qquad D=-7+11=4$

$-72+58-16=-30$

$\begin{pmatrix} 29 & 2 & -3 \\ 4 & 3 & -2 \\ 8 & -1 & -2 \end{pmatrix} \begin{matrix} 29 & 2 \\ 4 & 3 \\ 8 & -1 \end{matrix} \quad D_x=-194+30=-164$

$-174-32+12=-194$

$-12-16-58=-86$

$\begin{pmatrix} 1 & 29 & -3 \\ 1 & 4 & -2 \\ 1 & 8 & -2 \end{pmatrix} \begin{matrix} 1 & 29 \\ 1 & 4 \\ 1 & 8 \end{matrix} \quad D_y=-90+86=-4$

$-8-58-24=-90$

$87-4+16=+99$

$\begin{pmatrix} 1 & 2 & 29 \\ 1 & 3 & 4 \\ 1 & -1 & 8 \end{pmatrix} \begin{matrix} 1 & 2 \\ 1 & 3 \\ 1 & -1 \end{matrix} \quad D_z=3-99=-96$

$24+8-29=3$

$x=\frac{-164}{4}=41 \qquad x+y+z=1$

$41-1-24=1$

$y=\frac{+4}{-4}=-1$

$z=\frac{-96}{-4}=24$

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

$\begin{pmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 3 & 3 & 1 \end{pmatrix}$ $\begin{matrix} 2 & 1 \\ 0 & 2 \\ 3 & 3 \end{matrix}$ $0+4=4$

$D = 7-4 = 3$

$4+3+0=7$

$\begin{pmatrix} 5 & 1 & 0 \\ 7 & 2 & 1 \\ 7 & 2 & 1 \end{pmatrix}$ $\begin{matrix} 5 & 1 \\ 7 & 2 \\ 7 & 2 \end{matrix}$ $0+7+0+7=13$

$D_x = 17-13 = \frac{4}{3}$

$10+7+0=17$

$\begin{pmatrix} 2 & 5 & 0 \\ 0 & 3 & 1 \\ 3 & 7 & 1 \end{pmatrix}$ $\begin{matrix} 2 & 5 \\ 0 & 3 \\ 3 & 7 \end{matrix}$ $0+7+4+0=14$

$D_x = 21-14 = \frac{7}{3}$

$6+15+0=21$

$\begin{pmatrix} 2 & 1 & 5 \\ 0 & 2 & 3 \\ 3 & 2 & 7 \end{pmatrix}$ $\begin{matrix} 2 & 1 \\ 0 & 2 \\ 3 & 2 \end{matrix}$ $30+12+0=37$

$D_z = 37-42 = \frac{-5}{3}$

$28+9+0=37$

$V = \left\{\left(\frac{4}{3}, \frac{7}{3}, \frac{5}{3}\right)\right\}$ ALTERNATIVA D

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DSTQQSS

⑥ $\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 7 \\ -1 \end{bmatrix}$ $D\begin{pmatrix} 1x & 0y & 0z \\ 2x & 1y & 0z \\ -1x & 2y & 2z \end{pmatrix} \begin{matrix} ;3 \\ ;7 \\ ;-1 \end{matrix}$

ALTERNATIVA E, POIS Z=0

$D = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{pmatrix}$

D=1.1.2=2

0+0+0

$D\begin{pmatrix} 3 & 0 & 0 \\ 7 & 1 & 0 \\ -1 & 2 & 2 \end{pmatrix} \begin{matrix} 3 & 0 \\ 7 & 1 \\ -1 & 2 \end{matrix}$ $D_x = 6$ $x = \frac{6}{2} = 3$

6+0+0=6

0+0+0

$\begin{pmatrix} 1 & 3 & 0 \\ 2 & 7 & 0 \\ -1 & -1 & 2 \end{pmatrix} \begin{matrix} 1 & 3 \\ 2 & 7 \\ -1 & -1 \end{matrix}$ $D_y = 14-12 = 2$ $y = \frac{2}{2} = 1$

14+0+0=14

-3+7+0=11

$\begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & 7 \\ -1 & 2 & -1 \end{pmatrix} \begin{matrix} 1 & 0 \\ 2 & 1 \\ -1 & 2 \end{matrix}$ $D_z = 11-11 = 0$ $z = \frac{0}{2} = 0$

-1+0+12=11

TAREFA BÁSICA PARTE 2: ESCALONAMENTO

① $\begin{cases} 2x - y - 3z = -5 \\ x + 3y - z = 11 \\ x - 5z = 3 \end{cases}$

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

$-9 - 0 + 5 = -4$

$-30 + 7 + 0 = -29$

$D = -29 + 4 = -25$

$-2 + 6 + 0 + 55 = 28$

$D_x \begin{pmatrix} -5 & -1 & -3 \\ 11 & 3 & -1 \\ 3 & 0 & -5 \end{pmatrix}$ $\begin{matrix} -5 & -1 \\ 11 & 3 \\ 3 & 0 \end{matrix}$ $D_x = 78 - 28 = 50$ $x = \frac{50}{-25} = -2$

$75 + 3 - 0 = 78$

$-33 - 6 + 25 = -14$

$D_y \begin{pmatrix} 2 & -5 & -3 \\ 1 & 11 & -1 \\ 1 & 3 & -5 \end{pmatrix}$ $\begin{matrix} 2 & -5 \\ 1 & 11 \\ 1 & 3 \end{matrix}$ $D_y = -114 + 14 = -100$ $y = \frac{-100}{-25} = 4$

$-110 + 5 - 9 = -114$

$-15 + 0 - 3 = -18$

$V = \{(-2, 4, -1)\}$

$D_z \begin{pmatrix} 2 & -1 & -5 \\ 1 & 3 & 11 \\ 1 & 0 & 3 \end{pmatrix}$ $\begin{matrix} 2 & -1 \\ 1 & 3 \\ 1 & 0 \end{matrix}$ $D_z = 7 + 18 = 25$ $z = \frac{25}{-25} = -1$

$18 - 11 + 0 = 7$

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DSTQQSS

② $\begin{cases} x = 2y \\ 2y = 3z \\ x + y + z = 11 \end{cases}$

$\begin{pmatrix} 1 & -2 & 0 \\ 0 & 2 & -3 \\ 1 & 1 & 1 \end{pmatrix} \begin{matrix} 1 & -2 \\ 0 & 2 \\ 1 & 1 \end{matrix}$

$0 - 3 + 0 = -3$

$D = 8 + 3 = 11$

$2 + 6 + 0 = 8$

$0 + 0 + 0$

$D_z \begin{pmatrix} 1 & -2 & 0 \\ 0 & 2 & 0 \\ 1 & 1 & 11 \end{pmatrix} \begin{matrix} 1 & -2 \\ 0 & 2 \\ 1 & 1 \end{matrix}$

$D_z = 22 \quad z = \frac{22}{11} = 2$

$22 + 0 + 0 = 22$

$2y = 3z \quad x = 2y \quad x + 2y + 3z$

$2y = 3 \cdot 2 \quad x = 2 \cdot 3 \quad 6 + (2 \cdot 3) + (3 \cdot 2)$

$y = \frac{6}{2} = 3 \quad x = 6 \quad 6 + 6 + 6$

18

ALTERNATIVA (B)

③ $\begin{cases} x + y + z = 0 \\ 2x - y - 2z = 1 \\ 6y + 3z = -12 \end{cases}$

$D = \begin{pmatrix} 1 & 1 & 1 \\ 2 & -1 & -2 \\ 0 & 6 & 3 \end{pmatrix} \begin{matrix} 1 & 1 \\ 2 & -1 \\ 0 & 6 \end{matrix}$

$0 - 12 + 6 = -6$

$D = 9 + 6$

15

$-3 + 0 + 12$

$0 + 6 + 24 = 18$

$D_z \begin{pmatrix} 1 & 1 & 0 \\ 2 & -1 & 1 \\ 0 & 6 & -12 \end{pmatrix} \begin{matrix} 1 & 1 \\ 2 & -1 \\ 0 & 6 \end{matrix}$

$D_z = 12 + 18 = 30 \quad z = \frac{30}{15} = 2$

$12 + 0 + 0 = 12$

ALTERNATIVA D