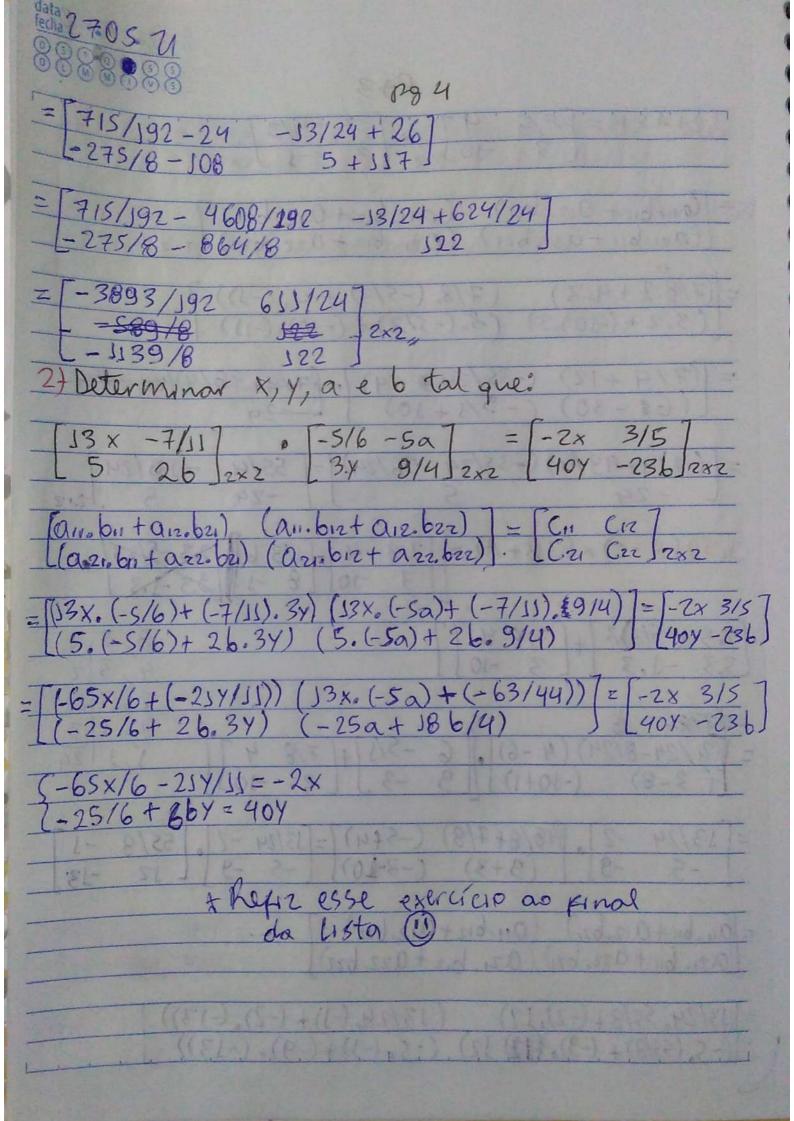data / ferha 27·05·21

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    Lista de Exercícios – Matemática 1 – Aula J3

1) Dadas as matrizes $A = \begin{bmatrix} 7/8 & 4 \\ 3 & -J0 \end{bmatrix}_{2\times2}$, $B = \begin{bmatrix} 2 & -5/3 \\ 3 & -J \end{bmatrix}_{2\times2}$
e $C = \begin{bmatrix} J/3 & 6 \\ 8 & -J \end{bmatrix}_{2\times2}$, determine:

1.1) $B^t - J/J3 \cdot (A+C) \Rightarrow B = \begin{bmatrix} 2 & -5/3 \\ 3 & -J \end{bmatrix}$, $B^t \begin{bmatrix} 2 & 3 \\ -5/3 & -J \end{bmatrix}_{2\times2}$

$= \begin{bmatrix} 2 & 3 \\ -5/3 & -J \end{bmatrix} - \frac{J}{J3} \cdot \left[\begin{bmatrix} 7/8 & 4 \\ 3 & -J0 \end{bmatrix} + \begin{bmatrix} J/3 & 6 \\ 8 & -J \end{bmatrix} \right]$ $\begin{matrix} 7/8 + J/3 & 4+6 \\ 3+8 & -J0-J \end{matrix}$

$= \begin{bmatrix} 2 & 3 \\ -5/3 & -J \end{bmatrix} - \frac{J}{J3} \cdot \begin{bmatrix} (2J/24 + 8/24) & (4+6) \\ (3+8) & (-J0+(-J)) \end{bmatrix}$ $\begin{matrix} 8,3 & 2 \\ 4,3 & 2 \\ 2,3 & 2 \\ J,3 & 3 \\ J,J & 24 \end{matrix}$

$= \begin{bmatrix} 2 & 3 \\ -5/3 & -J \end{bmatrix} - \frac{J}{J3} \cdot \begin{bmatrix} 29/24 & J0 \\ JJ & -JJ \end{bmatrix}$

$= \begin{bmatrix} 2 & 3 \\ -5/3 & -J \end{bmatrix} \cdot \begin{bmatrix} (29/24 \cdot (-J/J3)) & (J0 \cdot (-J/J3)) \\ (JJ \cdot (-J/J3)) & (-JJ \cdot (-J/J3)) \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ -5/3 & -J \end{bmatrix} \cdot \begin{bmatrix} -29/312 & -J0/B \\ -JJ/J3 & JJ/J3 \end{bmatrix}$

$= \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix} \cdot \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} = \begin{bmatrix} (b_{11} \cdot a_{11} + b_{12} \cdot a_{21}) & (b_{11} \cdot a_{12} + b_{12} \cdot a_{22}) \\ (b_{21} \cdot a_{11} + b_{22} \cdot a_{21}) & (b_{21} \cdot a_{12} + b_{22} \cdot a_{22}) \end{bmatrix}$

$= \begin{bmatrix} 2 \cdot (-29/312) + 3 \cdot (-JJ/J3) & 2 \cdot (-J0/J3) + 3 \cdot JJ/J3 \\ -5/3 \cdot (-29/312) + (-J) \cdot (-JJ/J3) & -5/3 \cdot (-J0/J3) + (-J) \cdot JJ/J3 \end{bmatrix}$

$= \begin{bmatrix} (-58/624 + -33/J3) & (-20/13 + 33/J3) \\ (J45/936 + JJ/J3) & (+50/39 + -JJ/J3) \end{bmatrix} = \begin{bmatrix} -58/312 \\ J45/93 \end{bmatrix}$

$= \begin{bmatrix} (29/156 - 33/J3) & (J3/J3) \\ (J45/936 - JJ/J3) & (50/39 - 33/39) \end{bmatrix} = \begin{bmatrix} (29/156 - 33/J3) & J \\ (J45/936 - JJ/J3) & J7/39 \end{bmatrix}$

$$\sqrt{56},\ \sqrt{3} \mid 2,\ 4$$
$$78,\ \sqrt{3} \mid 2$$
$$39,\ \sqrt{3} \mid 3,\ \sqrt{2}$$
$$13,\ \sqrt{3} \mid \sqrt{3}$$
$$\sqrt{},\ \sqrt{} \mid \sqrt{56}$$

$$936,\ 13 \mid 2,$$
$$468,\ \sqrt{3} \mid 2,\ 4$$
$$234,\ \sqrt{3} \mid 2,\ 8$$
$$\sqrt{17},\ \sqrt{3} \mid 3,\ 24$$
$$39,\ \sqrt{3} \mid 3,\ 72$$
$$\sqrt{3},\ \sqrt{3} \mid \sqrt{3}$$
$$\sqrt{},\ \sqrt{} \mid 936$$

$$= \begin{bmatrix} -367/\sqrt{56} & \sqrt{} \\ -647/936 & \sqrt{7}/39 \end{bmatrix}_{2\times2}$$

$$= \begin{bmatrix} (29/\sqrt{56} - 33/\sqrt{3}) & (\sqrt{}) \\ (\sqrt{45}/936 - \sqrt{\sqrt{}}/\sqrt{3}) & (\sqrt{7}/39) \end{bmatrix} = \begin{bmatrix} (29/\sqrt{56} - 396/\sqrt{56}) & (1) \\ (\sqrt{45}/936 - 792/936) & (\sqrt{7}/39) \end{bmatrix}$$

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Pg3

$J.2)\ A\times B = \begin{bmatrix} 7/8 & 4 \\ 3 & -\jmath0 \end{bmatrix}_{2\times2} \cdot \begin{bmatrix} 2 & -5/3 \\ 3 & -\jmath \end{bmatrix}_{2\times2}$

$= \begin{bmatrix} (a_{11}\cdot b_{11}+a_{12}\cdot b_{21}) & (a_{11}\cdot b_{12}+a_{12}\cdot b_{22}) \\ (a_{21}\cdot b_{11}+a_{22}\cdot b_{21}) & (a_{21}\cdot b_{12}+a_{22}\cdot b_{22}) \end{bmatrix}_{2\times2}$

$= \begin{bmatrix} (7/8\cdot2+4\cdot3) & (7/8\cdot(-5/3)+4\cdot(-\jmath)) \\ (3\cdot2+(-\jmath0)\cdot3) & (3\cdot(-5/3)+(-\jmath0)\cdot(-\jmath)) \end{bmatrix}$

$= \begin{bmatrix} (7/4+12) & (-35/24 * -4) \\ (6\$-30) & (-5/3+\jmath0) \end{bmatrix} = \begin{bmatrix} 7/4+48/4 & 24-35/24- \\ -24 & \end{bmatrix}$

$= \begin{bmatrix} (7/4+48/4) & (-35/24-96/24) \\ -24 & 5 \end{bmatrix} = \begin{bmatrix} 55/4 & -\jmath33/24 \\ -24 & 5 \end{bmatrix}_{2\times2}$

$J.3)\ (A-C)\times(3B+A) = \left[\begin{bmatrix} 7/8 & 4 \\ 3 & -\jmath0 \end{bmatrix}-\begin{bmatrix} \jmath/3 & 6 \\ 8 & -\jmath \end{bmatrix}\right]\begin{bmatrix} 2\cdot3 & -5/3\cdot5 \\ 3\cdot3 & -\jmath\cdot3 \end{bmatrix}\cdot$

$\begin{bmatrix} 2\cdot3 & (-5/3)\cdot3 \\ 3\cdot3 & -\jmath\cdot3 \end{bmatrix}+\begin{bmatrix} 7/8 & 4 \\ 3 & -\jmath0 \end{bmatrix}\ \Big]$

$\begin{array}{c} 8,3 \mid 2 \\ 4,3 \mid 2 \\ 2,3 \mid 2 \\ 1,3 \mid 3 \\ \jmath,\jmath \mid 24 \end{array}$

$= \begin{bmatrix} (2\jmath/24-8/24) & (4-6) \\ (3-8) & (-\jmath0+\jmath) \end{bmatrix}\cdot\begin{bmatrix} 6 & -5/\jmath \\ 9 & -3 \end{bmatrix}+\begin{bmatrix} 7/8 & 4 \\ 3 & -\jmath0 \end{bmatrix}$

$= \begin{bmatrix} \jmath3/24 & -2 \\ -5 & -9 \end{bmatrix}\cdot\begin{bmatrix} (48/8+7/8) & (-5+4) \\ (9+3) & (-3-\jmath0) \end{bmatrix} = \begin{bmatrix} \jmath3/24 & -2 \\ -5 & -9 \end{bmatrix}\cdot\begin{bmatrix} 55/8 & -\jmath \\ \jmath2 & -\jmath3 \end{bmatrix}$

$= \begin{bmatrix} (a_{11}\cdot b_{11}+a_{12}\cdot b_{21}) & (a_{11}\cdot b_{12}+a_{12}\cdot b_{22}) \\ (a_{21}\cdot b_{11}+a_{22}\cdot b_{21}) & (a_{21}\cdot b_{12}+a_{22}\cdot b_{22}) \end{bmatrix}$

$= \begin{bmatrix} (\jmath3/24\cdot55/8+(-2)\cdot\jmath2) & (\jmath3/24\cdot(-\jmath)+(-2)\cdot(-\jmath3)) \\ (-5\cdot(55/8)+(-9)\cdot\jmath2) & (-5\cdot(-\jmath)+(-9)\cdot(-\jmath3)) \end{bmatrix}$

$$= \begin{bmatrix} 7\sqrt{15}/\sqrt{192} - 24 & -\sqrt{3}/24 + 26 \\ -275/8 - \sqrt{108} & 5 + \sqrt{17} \end{bmatrix}$$

$$= \begin{bmatrix} 7\sqrt{15}/\sqrt{192} - 4608/\sqrt{192} & -\sqrt{3}/24 + 624/24 \\ -275/8 - 864/8 & \sqrt{22} \end{bmatrix}$$

$$= \begin{bmatrix} -3893/\sqrt{192} & 6\sqrt{3}/24 \\ \cancel{-589/8} & \cancel{\sqrt{22}} \\ -\sqrt{139}/8 & \sqrt{22} \end{bmatrix}_{2\times 2}$$

2) Determinar x, y, a e b tal que:

$$\begin{bmatrix} \sqrt{3}x & -7/\sqrt{11} \\ 5 & 2b \end{bmatrix}_{2\times 2} \cdot \begin{bmatrix} -5/6 & -5a \\ 3.y & 9/4 \end{bmatrix}_{2\times 2} = \begin{bmatrix} -2x & 3/5 \\ 40y & -23b \end{bmatrix}_{2\times 2}$$

$$\begin{bmatrix} (a_{11}.b_{11} + a_{12}.b_{21}) & (a_{11}.b_{12} + a_{12}.b_{22}) \\ (a_{21}.b_{11} + a_{22}.b_{21}) & (a_{21}.b_{12} + a_{22}.b_{22}) \end{bmatrix} = \begin{bmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{bmatrix}_{2\times 2}$$

$$= \begin{bmatrix} (\sqrt{3}x.(-5/6) + (-7/\sqrt{11}).3y) & (\sqrt{3}x.(-5a) + (-7/\sqrt{11}).\cancel{9/4}) \\ (5.(-5/6) + 2b.3y) & (5.(-5a) + 2b.9/4) \end{bmatrix} = \begin{bmatrix} -2x & 3/5 \\ 40y & -23b \end{bmatrix}$$

$$= \begin{bmatrix} (-65x/6 + (-2\sqrt{3}y/\sqrt{11})) & (\sqrt{3}x.(-5a) + (-63/44)) \\ (-25/6 + 2b.3y) & (-25a + \sqrt{8}b/4) \end{bmatrix} = \begin{bmatrix} -2x & 3/5 \\ 40y & -23b \end{bmatrix}$$

$$\begin{cases} -65x/6 - 2\sqrt{3}y/\sqrt{11} = -2x \\ -25/6 + 6by = 40y \end{cases}$$

* Refiz esse exercício ao final
da lista ☺

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3) A solução do sistema $\begin{cases}(a-2)x+by=1 \\ (a+2)x+2by=5\end{cases}$ e

$x=-7$ e $y=5$. Determine os valores de a e b.

$\begin{cases}(a-2)\cdot(-7)+b\cdot5=1 \\ (a+2)\cdot(-7)+2b\cdot5=5\end{cases}$

$5b=32$

$\boxed{b=\dfrac{32}{5}}$

$\begin{cases}-7a+14+5b=1 \\ -7a-14+10b=5\end{cases}$

$\begin{cases}-7a+5b=1-14 \\ -7a+10b=5+14\end{cases}$

$\begin{cases}-7a+5b=-13 \quad\cdot(-1) \\ -7a+10b=+19\end{cases}$

$\begin{cases}7a-5b=13 \\ -7a+10b=19\end{cases}+$

$0+5b=32$

$(a,b)=\left(\dfrac{45}{7},\dfrac{32}{5}\right)$

$\begin{cases}-7a+5b=-13 \quad\cdot(-2) \\ -7a+10b=+19\end{cases}$

$\begin{cases}14a-10b=26 \\ -7a+10b=19\end{cases}+$

$7a+0=45$

$\boxed{a=\dfrac{45}{7}}$

2) Determinar x, y, a e b tal que:

$\begin{bmatrix}13 & -7/11 \\ 5 & 2\end{bmatrix}_{2\times2}\cdot\begin{bmatrix}5/6\,x & -5a \\ 3y & 9/4\,b\end{bmatrix}_{2\times2}=\begin{bmatrix}-2 & 3/5 \\ 40 & -23\end{bmatrix}_{2\times2}$

$\begin{bmatrix}(a_{11}\cdot b_{11}+a_{12}\cdot b_{21}) & (a_{11}\cdot b_{12}+a_{12}\cdot b_{22}) \\ (a_{21}\cdot b_{11}+a_{22}\cdot b_{21}) & (a_{21}\cdot b_{12}+a_{22}\cdot b_{22})\end{bmatrix}=\begin{bmatrix}C_{11} & C_{12} \\ C_{21} & C_{22}\end{bmatrix}_{2\times2}$

$=\begin{bmatrix}(13\cdot(5/6\,x)+(-7/11)\cdot3y) & (13\cdot(-5a)+(-7/11)\cdot9/4\,b) \\ (5\cdot(5/6x)+2\cdot3y) & (5\cdot(-5a)+(2\cdot(9/4\,b)))\end{bmatrix}=\begin{bmatrix}-2 & 3/5 \\ 40 & -23\end{bmatrix}$

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$$= \begin{bmatrix} (65x/6 + (-2Jy/JJ)) & (-65a + (-63b/44)) \\ (25x/6 + 6y) & (-25a + J8b/4)) \end{bmatrix} = \begin{bmatrix} -2 & 3/5 \\ 40 & -23 \end{bmatrix}$$

$$= \begin{cases} 65x/6 + -2Jy/JJ = -2 & -25/6 \\ 25x/6 + 6y = 40 & 65/6 \end{cases}$$

$$\begin{cases} 65x/6 \cdot (-25/6) - 2Jy/JJ \cdot (-25/6) = -2 \cdot (-25/6) & \overset{:3}{} \quad \overset{:2}{} \\ 25x/6 \cdot (65/6) + 6y \cdot (65/6) = 40 \cdot (65/6) & \overset{:2}{} \quad \overset{:2}{} \end{cases}$$

$$\begin{cases} -J625x + J75y/22 = 25/3 \\ +1625x + 6Sy = J300/3 \end{cases} +$$

$$\frac{0 + J75y}{22} + \frac{J430y}{22} = \frac{J925}{3}$$

$$\frac{J605y}{22} = \frac{J325}{3}$$

$$y = \frac{J325 : 5 \cdot 22}{J605 : 5 \cdot 3}$$

$$y = \frac{265 \cdot 22}{3 2J \cdot 3}$$

$$\boxed{y = \frac{5830}{963}}$$

$$\begin{cases} 65x/6 - 2Jy/JJ = -2 & .6 \\ 25x/6 + 6y = 40 & .2J \end{cases}$$

$$\begin{cases} 65x/6 \cdot (6) - 2Jy/JJ \cdot (6) = -2 \cdot 6 & \overset{:3}{} \\ 25x/6 \cdot (2J) + 2Jy/JJ \cdot (2J) = \frac{40 \cdot 2J}{JJ} & \overset{:3}{} \end{cases}$$

$$\begin{cases} 65x - 7y/JJ \cdot 2 = -J2 \\ 25x \cdot (7)/2 - 7y/JJ(2) = 840 \end{cases} +$$

$$\frac{J605x}{22} - 0 = \frac{840}{JJ} + \frac{(-J32)}{JJ}$$

$$\frac{J605x}{22} = \frac{708}{JJJ} \longrightarrow x = \frac{708 \cdot 2}{J605}$$

$$\boxed{x = \frac{J416}{J605}}$$

$$\begin{cases} -65a + (-63b/44) = 3/5 & .(-25) \\ -25a + J8b/4 = -23 & .(65) \end{cases}$$

$$\begin{cases} -65a \cdot (-25) + -63b/44 \cdot (-25) = 3/5 \cdot (-25) \\ -25a \cdot (65) + J8b/4 \cdot (65) = -23 \cdot (65) \end{cases}$$

$$\begin{cases} +\text{5625}a + \text{5575}b/44 = -75/5 \\ -\text{5625}a + \text{5170}b/4 = -\text{5495} \end{cases}$$
$:2 :2$

$$\begin{cases} \text{5625}a + \text{5575}b/44 = -\text{55} \\ -\text{5625}a + 585b/2 = -\text{5495} \end{cases} +$$

$$0 + \frac{\text{5575}b}{44} + \frac{585b}{2} = \frac{-\text{5510}}{5}$$

$$\frac{\text{5575}b + \text{52870}b}{44} = \frac{-\text{5510}}{5}$$

$$\frac{\text{54445}b}{44} = \frac{-\text{5510}}{5}$$

$$b = \frac{-\text{5510} \cdot 44}{\text{54445}}$$

$$b = \frac{-66440}{\text{54445}} \overset{:5}{:5}$$

$$\boxed{b = \frac{\text{53288}}{2889}}$$

44, 2 | 2 ⟩₄
22, 5 | 2 ⟩
55, 5 | 55 ⟩
5, 5 | 44

$$\begin{cases} -65a + (-63b/44) = 3/5 \\ -25a + \text{58}b/4 = -23 \end{cases}$$

$$\begin{cases} -65a + -63b/44 = 3/5 \quad (\text{58}/4) \\ -25a + \text{58}b/4 = -23 \quad \cdot(63/44) \end{cases}$$
$:4 :4$

$$\begin{cases} -65a \cdot (\text{58}/4) - 63b/44 \cdot (\text{58}/4) = 3/5 \cdot \text{58}/4 \\ -25a \cdot (\text{58}/4) + \text{58} \\ -25a \cdot (63/44) + \text{58}b/4 \cdot (63/44) = -23 \cdot (63/44) \end{cases}$$

$$\begin{cases} -\text{5570}a/4 - \text{55346}/\text{55} = 54/20 \\ -\text{5575}a/44 + \text{55346}/\text{55} = -\text{5449}/44 \end{cases} +$$

$$0$$

$$-\text{5570}$$

$$\frac{-\text{5575}a}{44} - \frac{\text{5570}a}{4} = \frac{-\text{5449}}{44} + \frac{54}{20}$$

$$\frac{-\text{5575}a - \text{52870}a}{44} = \frac{-7245 + 594}{220}$$

$$\frac{-\text{54445}a}{44} = \frac{7839 - 6651}{220} \quad \cdot(-1)$$

$$\frac{\text{54445}a}{44} = \frac{6651}{220}$$

$$a = \frac{6651 \cdot 44}{\text{54445}}$$

$$a = \frac{292644}{\text{54445}} \overset{:9}{:9} \Rightarrow \boxed{a = \frac{32516}{5605}}$$

44, 20 | 2 ⟩₄
22, 10 | 2 ⟩
55, 5 | 5 ⟩₂₀
55, 5 | 55 ⟩
5, 5 | 220

"A cada dia novos aprendizados". Obrigado por tudo professora ☺