

Matemáticas Gerais II

Soluções da Folha Prática 1

2005/2006

1. (a) $\begin{bmatrix} 5 & -10 \\ 5 & 0 \\ 10 & 15 \end{bmatrix}$; (b) $\begin{bmatrix} 2 & 0 \\ 4 & 4 \\ 7 & 9 \end{bmatrix}$; (c) $\begin{bmatrix} -1 & 6 \\ 1 & 4 \\ 1 & 0 \end{bmatrix}$; (d),(e),(j) impossível;

(f) $\begin{bmatrix} -2 & -1 & -4 \\ 0 & -1 & 0 \\ 3 & -2 & 6 \end{bmatrix}$; (g) $\begin{bmatrix} -1 & 0 \\ 5 & 4 \end{bmatrix}$; (h) $\begin{bmatrix} -3 & 1 & -2 \\ 1 & 1 & 2 \\ 8 & 2 & 7 \end{bmatrix}$; (i) $\begin{bmatrix} 0 & 0 \\ 3 & -3 \end{bmatrix}$.

2. $a = 2$ e $b = 1$. 3. $Y = -\frac{1}{2}X = \begin{bmatrix} -\frac{1}{2} & 1 & 0 \\ -2 & -\frac{3}{2} & -\frac{1}{2} \\ -1 & \frac{1}{2} & -\frac{3}{2} \end{bmatrix}$. 4. $\begin{bmatrix} 1 & 1 & 0 \\ 4 & 0 & 0 \end{bmatrix}$.

5. $ADBC = \begin{bmatrix} 2 \\ -2 \end{bmatrix}$ ou $BADC = \begin{bmatrix} 5 \\ -2 \end{bmatrix}$. 6. $\alpha = 3$.

7. Primeira coluna: $\begin{bmatrix} 2 \\ 3 \\ 2 \end{bmatrix}$, segunda linha: $[3 \ 4]$.

8. (a) $x = 0, y = 3, z = 1, t = 5$; (b) $x = 1, y = 6, z = 0, t = -2$;
(c) $x = -\sqrt{2}y, y \in \mathbb{R}, z = -\sqrt{2}t, t \in \mathbb{R}$.

9. Não.

10. (a) — (b) $A^3 = 3A - 2I_2 = \begin{bmatrix} 1 & 0 \\ -3 & 1 \end{bmatrix}$ [em geral, $A^n = nA - (n-1)I_2, n \in \mathbb{N}$].

11. (a) — (b) $\begin{bmatrix} -9 & 2 \\ -31 & 13 \end{bmatrix}$.

12. $N^2 = -\sqrt{2}I_2$ e $N^{15} = N(N^2)^7 = \begin{bmatrix} 0 & 8\sqrt{2} \\ -16 & 0 \end{bmatrix}$.

13. $A^T B^T$ é impossível, $(AB)^T = B^T A^T = \begin{bmatrix} 7 & -3 & 1 \\ -2 & 0 & -2 \end{bmatrix}$. 14. iii. $AB = 0_2$.

15. (a) V; (b) F; (c) F; (d) F; (e) V; (f) V.

16. Matrizes escalonada por linhas: B e D ,

$$A \sim I_3, \quad B \sim \begin{bmatrix} 1 & 0 & 5 \\ 0 & 1 & -\frac{1}{2} \end{bmatrix}, \quad C \sim \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}, \quad D \sim \begin{bmatrix} 1 & 3 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

17. $\text{car } A = 3, \quad \text{car } B = 3, \quad \text{car } C = 1$.

18. $\text{car } A = 2 \Leftrightarrow a = 2$ e $\text{car } A = 3 \Leftrightarrow a \neq 2$;

$\text{car } B = 2 \Leftrightarrow (a = 0 \text{ ou } b = 1)$ e $\text{car } B = 2 \Leftrightarrow (a \neq 0 \text{ e } b \neq 1)$;

$\text{car } C = 2 \Leftrightarrow (a = 0 \text{ ou } b = 0)$ e $\text{car } C = 2 \Leftrightarrow (a \neq 0 \text{ e } b \neq 0)$.