Atividade 1

Disciplina: Álgebra e Geometria Analítica.
Professor: Claudemir Mota.
Aluno: Igor Lima Rocha.

Considerando as matrizes

$$M \cdot C = \begin{bmatrix} 1+26a+11c & 11+26b & 26 \\ 20+32b+12c & 12+32b & 32 \\ 14+31a+4c & 4+31b & 31 \end{bmatrix} e$$

$$C = \begin{bmatrix} a & b & 1 \\ a+c & b+1 & 1 \\ a+1 & b & 1 \end{bmatrix},$$

onde $a = 2$, $b = 8$ e $c = 2$, e
utilizando as operações elementares em C:

$$\begin{bmatrix} 2 & 8 & 1 & \vdots & 1 & 0 & 0 \\ 4 & 9 & 1 & \vdots & 0 & 1 & 0 \\ 3 & 8 & 1 & \vdots & 0 & 0 & 1 \end{bmatrix} L_1 \Rightarrow \frac{L_1}{2} \begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 4 & 9 & 1 & \vdots & 0 & 1 & 0 \\ 3 & 8 & 1 & \vdots & 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 4 & 9 & 1 & \vdots & 0 & 1 & 0 \\ 3 & 8 & 1 & \vdots & 0 & 0 & 1 \end{bmatrix} L_2 \Rightarrow L_2 - (4 \cdot L_1) \begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 0 & -7 & -1 & \vdots & -2 & 1 & 0 \\ 3 & 8 & 1 & \vdots & 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 4 & 9 & 1 & \vdots & 0 & 1 & 0 \\ 3 & 8 & 1 & \vdots & 0 & 0 & 1 \end{bmatrix} L_2 \Rightarrow L_2 - (4 \cdot L_1) \begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 0 & -7 & -1 & \vdots & -2 & 1 & 0 \\ 3 & 8 & 1 & \vdots & 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 0 & -7 & -1 & \vdots & -2 & 1 & 0 \\ 3 & 8 & 1 & \vdots & 0 & 0 & 1 \end{bmatrix} L_3 \Rightarrow L_3 - (3 \cdot L_1) \begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 0 & -7 & -1 & \vdots & -2 & 1 & 0 \\ 0 & -4 & -\frac{1}{2} & \vdots & -\frac{3}{2} & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 4 & \frac{1}{2} & \vdots & \frac{1}{2} & 0 & 0 \\ 0 & -7 & -1 & \vdots & -2 & 1 & 0 \\ 0 & -4 & -\frac{1}{2} & \vdots & -\frac{3}{2} & 0 & 1 \end{bmatrix} L_1 \Rightarrow L_1 + L_3 \begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & -7 & -1 & \vdots & -2 & 1 & 0 \\ 0 & -4 & -\frac{1}{2} & \vdots & -\frac{3}{2} & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & -7 & -1 & \vdots & -2 & 1 & 0 \\ 0 & -4 & -\frac{1}{2} & \vdots & -\frac{3}{2} & 0 & 1 \end{bmatrix} L_2 \Rightarrow \frac{L_2}{-7} \begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & 1 & \frac{1}{7} & \vdots & \frac{2}{7} & -\frac{1}{7} & 0 \\ 0 & -4 & -\frac{1}{2} & \vdots & -\frac{3}{2} & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & 1 & \frac{1}{7} & \vdots & \frac{2}{7} & -\frac{1}{7} & 0 \\ 0 & -4 & -\frac{1}{2} & \vdots & -\frac{3}{2} & 0 & 1 \end{bmatrix} L_3 \Rightarrow L_3 + 4 \cdot L_2 \begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & 1 & \frac{1}{7} & \vdots & \frac{2}{7} & -\frac{1}{7} & 0 \\ 0 & 0 & \frac{1}{14} & \vdots & -\frac{5}{14} & -\frac{4}{7} & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & 1 & \frac{1}{7} & \vdots & \frac{2}{7} & -\frac{1}{7} & 0 \\ 0 & 0 & \frac{1}{14} & \vdots & -\frac{5}{14} & -\frac{4}{7} & 1 \end{bmatrix} L_2 \Rightarrow L_2 - 2 \cdot L_3 \begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & 1 & 0 & \vdots & 1 & 1 & -2 \\ 0 & 0 & \frac{1}{14} & \vdots & -\frac{5}{14} & -\frac{4}{7} & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & 1 & 0 & \vdots & 1 & 1 & -2 \\ 0 & 0 & \frac{1}{14} & \vdots & -\frac{5}{14} & -\frac{4}{7} & 1 \end{bmatrix} L_3 \Rightarrow L_3 \cdot 14 \begin{bmatrix} 1 & 0 & 0 & \vdots & -1 & 0 & 1 \\ 0 & 1 & 0 & \vdots & 1 & 1 & -2 \\ 0 & 0 & 1 & \vdots & -5 & -8 & 14 \end{bmatrix}$$

onde

$$\begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & -2 \\ -5 & -8 & 14 \end{bmatrix} = C^{-1}$$

Fazendo a multiplicação

$$(M \cdot C) \qquad \cdot \qquad C^{-1}$$

$$\begin{bmatrix} 75 & 219 & 26 \\ 108 & 268 & 32 \\ 84 & 252 & 31 \end{bmatrix} \cdot \begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & -2 \\ -5 & -8 & 14 \end{bmatrix}$$

obtem-se:

$$\begin{bmatrix} -75 + 219 - 130 & 0 + 219 - 208 & 75 - 438 + 364 \\ -108 + 268 - 160 & 0 + 268 - 256 & 108 - 536 + 448 \\ -84 + 252 - 155 & 0 + 252 - 248 & 84 - 504 + 434 \end{bmatrix}$$

$$\Downarrow$$

$$\begin{bmatrix} 14 & 11 & 1 \\ 0 & 12 & 20 \\ 13 & 4 & 14 \end{bmatrix}$$

$$\Downarrow$$

$$\begin{bmatrix} O & L & A \\ - & M & U \\ N & D & O \end{bmatrix}$$