```
> restar :
> with(linalg) :
>
> Gabaito segunda lista
```

Gabaito segunda lista **(1)**

```
> 1 (a)

> A := matrix(3, 3, [9, -1, 1, -1, 4, 1, 1, 1, 1])
```

$$A := \begin{bmatrix} 9 & -1 & 1 \\ -1 & 4 & 1 \\ 1 & 1 & 1 \end{bmatrix} \quad \textbf{(2)}$$

```
> b := Vector([2, 1, -1])
```

$$b := \begin{bmatrix} 2 \\ 1 \\ -1 \end{bmatrix} \quad \textbf{(3)}$$

```
> R := inverse(A)
```

$$R := \begin{bmatrix} \frac{3}{20} & \frac{1}{10} & -\frac{1}{4} \\ \frac{1}{10} & \frac{2}{5} & -\frac{1}{2} \\ -\frac{1}{4} & -\frac{1}{2} & \frac{7}{4} \end{bmatrix} \quad \textbf{(4)}$$

```
> C := cholesky(A)
```

$$C := \begin{bmatrix} 3 & 0 & 0 \\ -\frac{1}{3} & \frac{1}{3}\sqrt{35} & 0 \\ \frac{1}{3} & \frac{2}{21}\sqrt{35} & \frac{2}{7}\sqrt{7} \end{bmatrix} \quad \textbf{(5)}$$

```
> (b) : 39 iterações usando a solução inicial o próprio vetor b :
>
> (c) : 20 iterações usando a solução inicial o próprio vetor b :
>
> (d) : 10 iterações usando a solução inicial o vetor nulo :
>
> (e) : 6 iterações usando a solução inicial o vetor nulo :
>
> (f) : Crout : LML'
> L := matrix(3, 3, [1.0000, 0, 0, -0.1111, 1.0000, 0, 0.1111, 0.2857, 1.0000])
```

(6)

$$L := \begin{bmatrix} 1.0000 & 0 & 0 \\ -0.1111 & 1.0000 & 0 \\ 0.1111 & 0.2857 & 1.0000 \end{bmatrix} \quad (6)$$

> $M := matrix(3, 3, [9.0000, 0, 0, 0, 3.8889, 0, 0, 0, 0.5714])$

$$M := \begin{bmatrix} 9.0000 & 0 & 0 \\ 0 & 3.8889 & 0 \\ 0 & 0 & 0.5714 \end{bmatrix} \quad (7)$$

> $L' = transpose(L)$

$$\begin{bmatrix} 1.0000 & -0.1111 & 0.1111 \\ 0 & 1.0000 & 0.2857 \\ 0 & 0 & 1.0000 \end{bmatrix} \quad (8)$$

> *Solução* **do** *sitema* : $x = [0.6500, 1.1000, -2.7500]$:

> 2 :

> $(a), (b), (c)$: *Olhar na página http ://www.dcc.ufrj.br/~rincon/Disciplinas/Calculo%20Numerico/Gabarito_sistemas.pdf* :

> (e) : *Sim basta calcular os determinantes das submatrizes* :

> (f) : *Usamos* 10 *iterações* $X = [-0.0029, 0.0049, -0.0053, -0.0049]$:

>

> (3) :

> (a) : *LU* : *Soma\subtração* $\left[\frac{n}{6}(n-1)(2n-1)\right]$; *Produto\divisão* $\left[\frac{n}{6}(n^2-1)\right]$:

>

> (b) : *Crout* : *Soma\subtração* $\left[\frac{n^3}{6} - \frac{n}{6}\right]$; *Produto\divisão* $\left[\frac{n^3}{6} + n^2 - \frac{7n}{6}\right]$;

>

> (c) : *Cholesky* : *Soma\subtração* $\left[\frac{n^3}{6} - \frac{n}{6}\right]$; *Produto\divisão* $\left[\frac{n^3}{6} + \frac{n^2}{2} - \frac{2n}{3}\right]$;

>

> 4

>

> $(a)\, f(x) := \sin\left(\frac{(2\cdot\pi)}{x}\right)$;

> $I(h) = evalf\left(\frac{0.5}{2}\cdot\left(\sin(2\cdot\pi) + 2\cdot\sin\left(\frac{4}{3}\cdot\pi\right) + \sin(\pi)\right)\right)$

$$I = -0.4330127020 \quad (9)$$

>

>

> $(b)\ I\left(\frac{h}{2}\right) = evalf\left(\frac{0.25}{2}\cdot\left(\sin(2\cdot\pi) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.25}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.5}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.75}\right) + \sin(\pi)\right)\right):$

> $II\left(\frac{h}{2}\right) = -0.5627414148$

$$II\left(\frac{1}{2}\ h\right) = -0.5627414148 \quad (10)$$

>

>

> $(c)\ S(h) = evalf\left(\frac{0.5}{2}\left(\sin(2\cdot\pi) + 4\cdot\sin\left(\frac{2\cdot\pi}{1.5}\right) + \sin\left(\frac{2\cdot\pi}{2}\right)\right)\right)$

$$S(h) = -0.8660254034 \quad (11)$$

>

>

> $(d)\ R_1 = evalf\left(\frac{4\cdot(-0.5627414148) - (-0.4330127020)}{3}\right) =$

>

$$-0.6059843190 \quad (12)$$

>

> $(e)\ III = evalf\left(\frac{0.25}{2}\cdot\left(\sin(2\cdot\pi) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.125}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.25}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.375}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.5}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.625}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.75}\right) + 2\cdot\sin\left(\frac{2\cdot\pi}{1.875}\right) + \sin(\pi)\right)\right)$

$$-1.188652265\ e \quad (13)$$

> $R_2 = \frac{(16\cdot(-1.188652265) - (-0.6059843190))}{15}$

$$R_2 = -1.227496795 \quad (14)$$

> $(f):$

>

> $x(t) = \frac{((2-1)t + 2 + 1)}{2}:$

> $dx = \frac{t}{2}dt:$

> $I = evalf\left(\frac{1}{2}\cdot 2\cdot\left(\sin\left(\frac{4\pi}{3}\right)\right)\right)$

$$I = -0.8660254040 \quad (15)$$

> $(g):$

> $I = evalf\left(\frac{1}{2}\cdot 1\cdot\left(\sin\left(\frac{2\pi}{\left(\frac{\text{sqrt}(3)}{3} + 3\right)}{2}\right) + \sin\left(\frac{2\pi}{\left(\frac{-\text{sqrt}(3)}{3} + 3\right)}{2}\right)\right)\right)$

$$I = -0.6260785849 \quad \textbf{(16)}$$

>

> (h) :

> $evalf\left(\int_1^2 \sin\left(\frac{2\pi}{x}\right) dx\right)$

$$-0.6046219610 \quad \textbf{(17)}$$

> $evalf\left(\int_0^1 \int_{-1}^1 \exp(-x\cdot y)\, dxdy\right)$

$$2.114501750 + 0.\,I \quad \textbf{(18)}$$

>

(19)

Numero 5 lista 2

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> (b)

> $I = evalf\left(\frac{1}{2}\left(\exp\left(-\frac{\mathrm{sqrt}(3)}{3}\right)\left(\frac{\left(-\frac{\mathrm{sqrt}(3)}{3}+1\right)}{2}\right)+\exp\left(-\frac{\mathrm{sqrt}(3)}{3}\right)\left(\frac{\left(\frac{\mathrm{sqrt}(3)}{3}+1\right)}{2}\right)+\exp\left(\frac{\mathrm{sqrt}(3)}{3}\right)\left(\frac{\left(-\frac{\mathrm{sqrt}(3)}{3}+1\right)}{2}\right)+\exp\left(\frac{\mathrm{sqrt}(3)}{3}\right)\left(\frac{\left(\frac{\mathrm{sqrt}(3)}{3}+1\right)}{2}\right)\right)\right)$

$$I = 2.342696088 \quad \textbf{(20)}$$

>

> (6) :

> $x_3 = 1.6 \qquad y_3 = 4.56592$

>

>

>

> (7) :

```
> A=[1 0 0 0 0;0 1 0 0 0;1 -2.375 1.25 0 0;0 1 -2.375 1.25 0;0 0 -1 -2.375 1.25]

A =

   1.0000         0         0         0         0
        0    1.0000         0         0         0
   1.0000   -2.3750    1.2500         0         0
        0    1.0000   -2.3750    1.2500         0
        0         0   -1.0000   -2.3750    1.2500

>> B=[2; 3;0.315;0.375;0.4375]

B =
```

```
    2.0000
    3.0000
    0.3150
    0.3750
    0.4375

>> X=A\B

X =

    2.0000
    3.0000
    4.3520
    6.1688
   15.5523

>>
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```