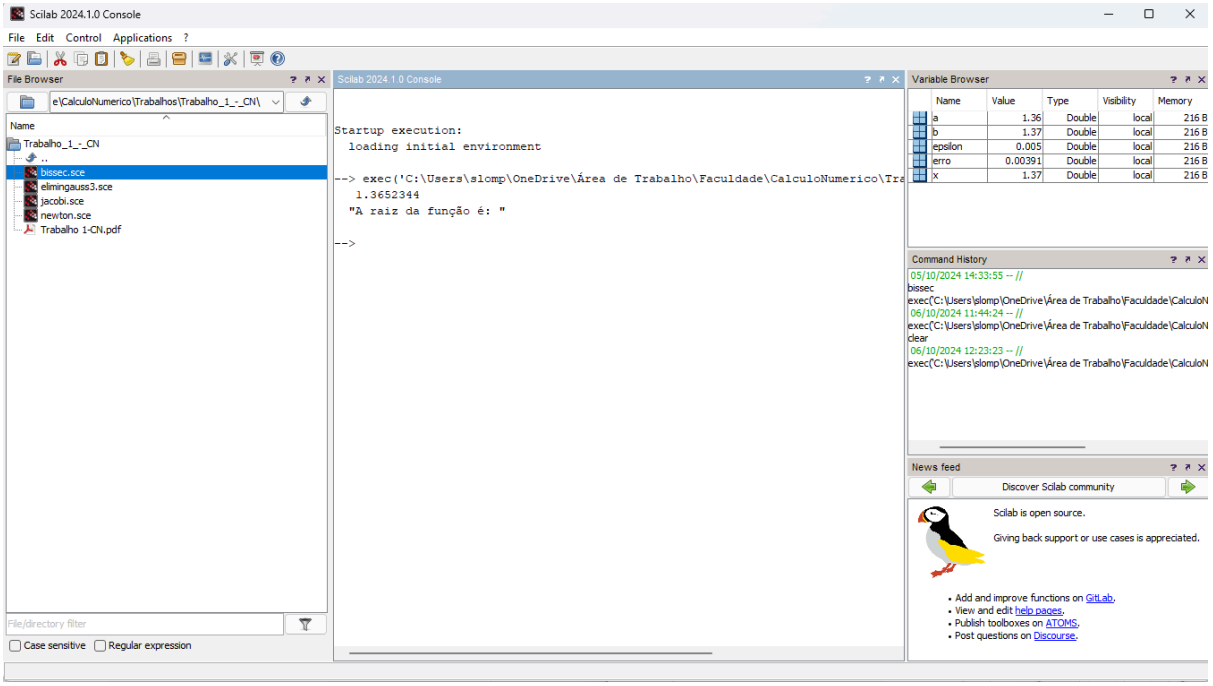
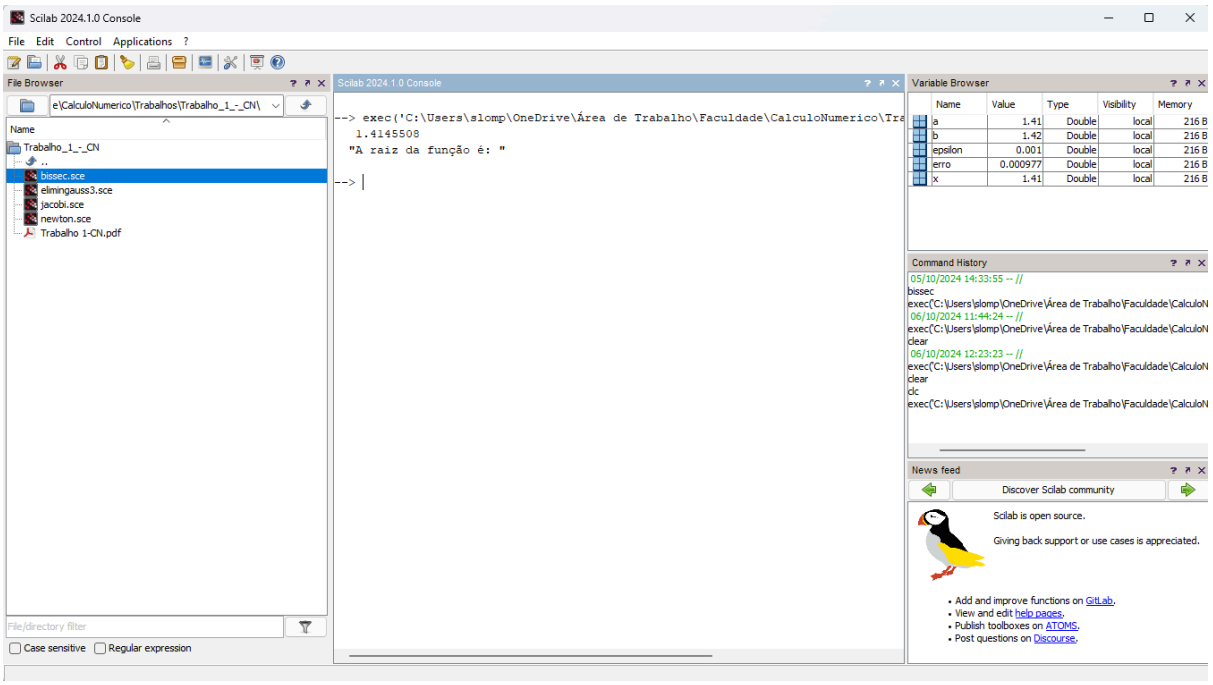
Instituto Federal Catarinense - Campus Blumenau
Aluno: Celio Ludwig Slomp

Questão 1:

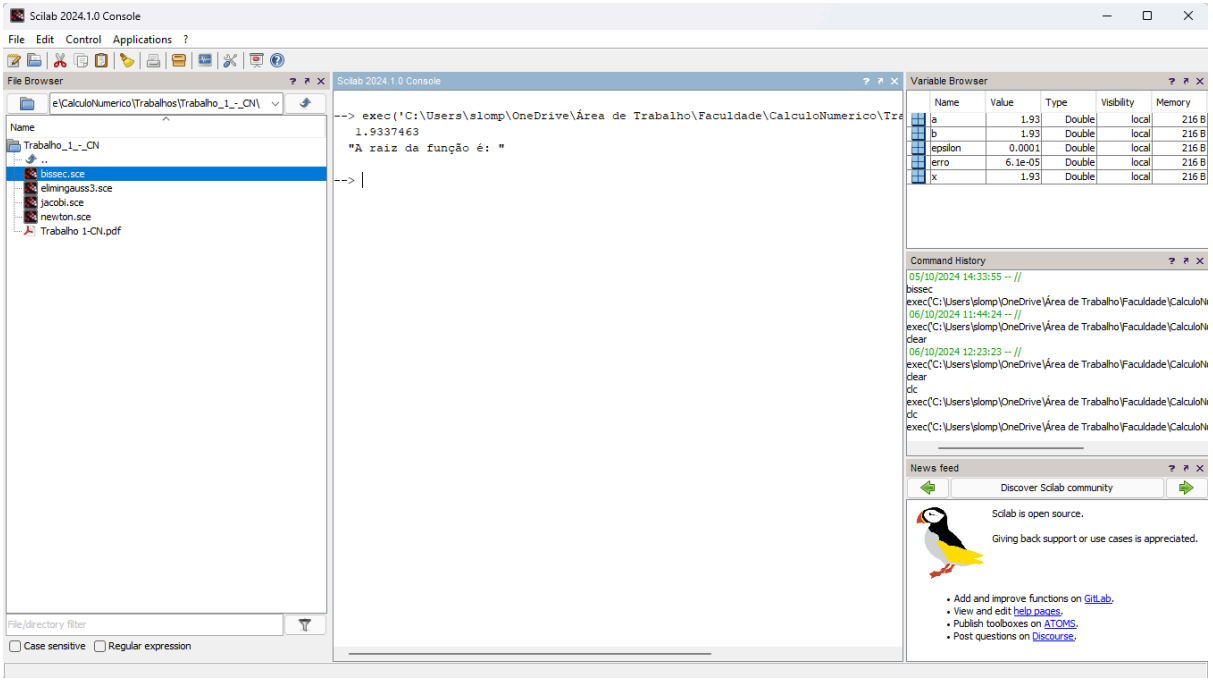
a)



b)

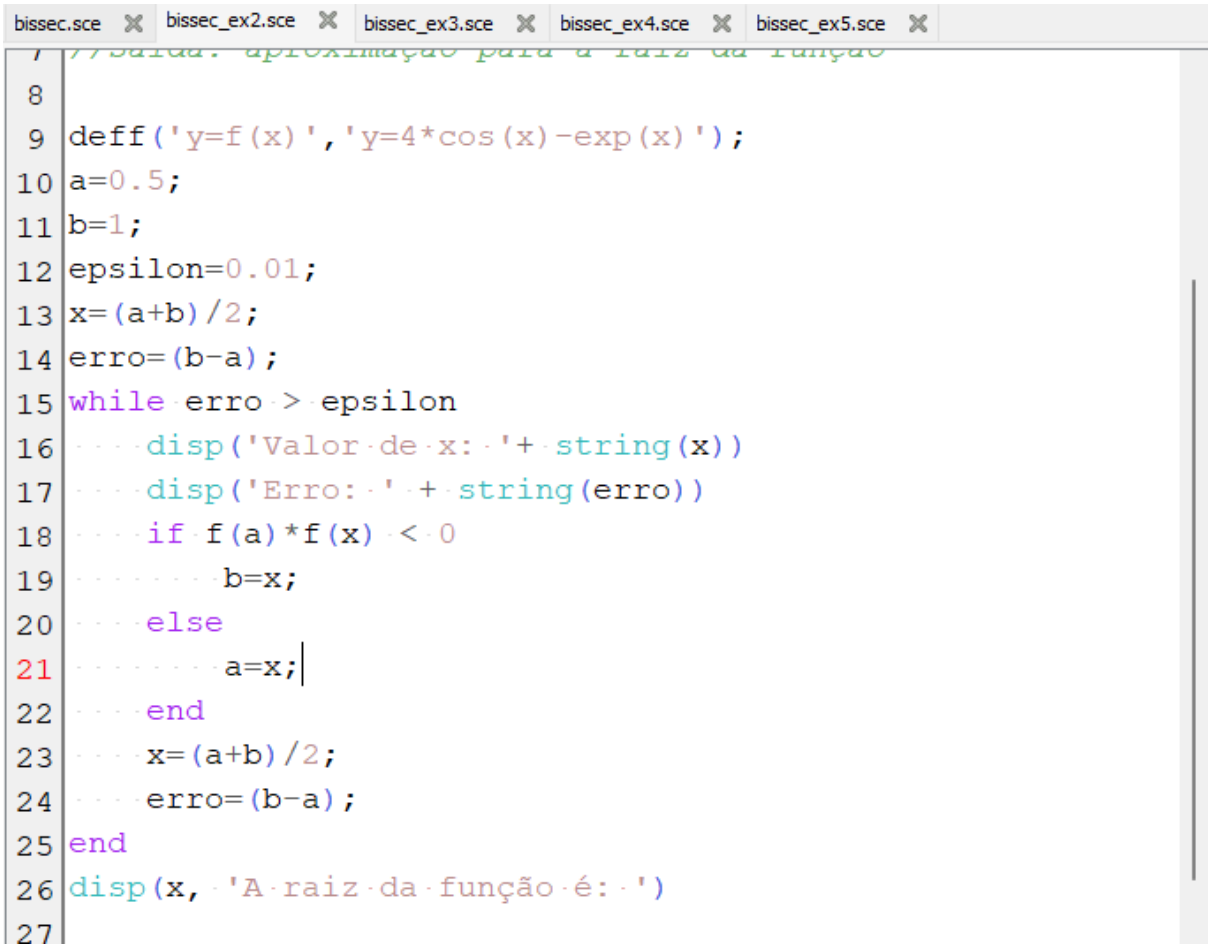


c)

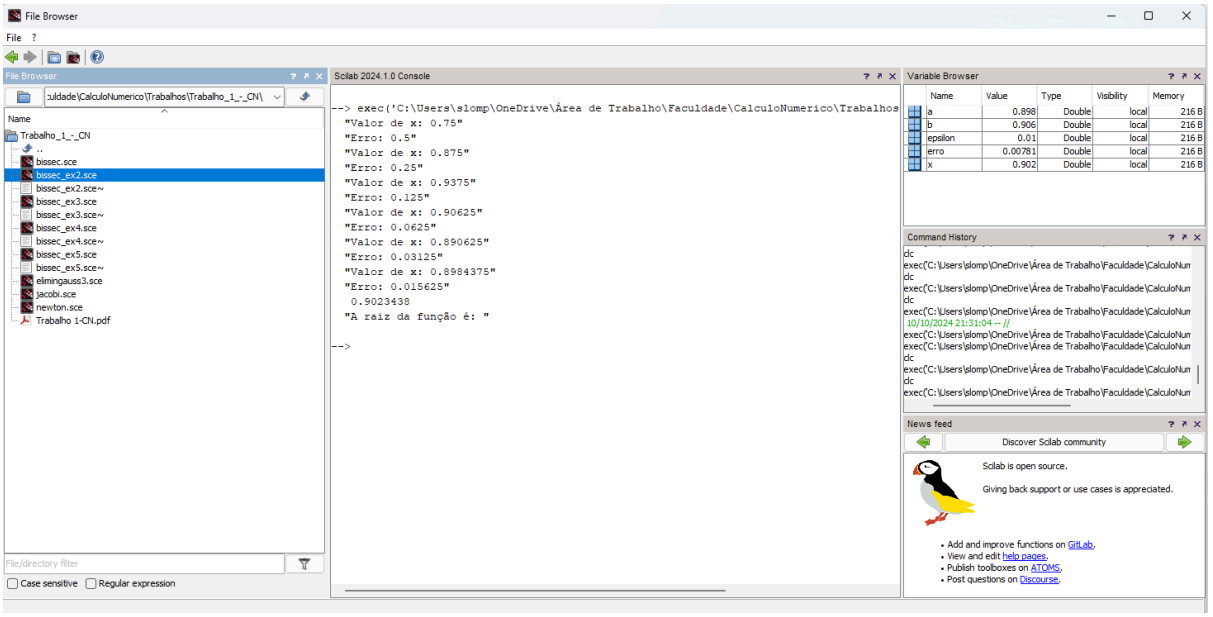


Questão 2:

Código:



Print:



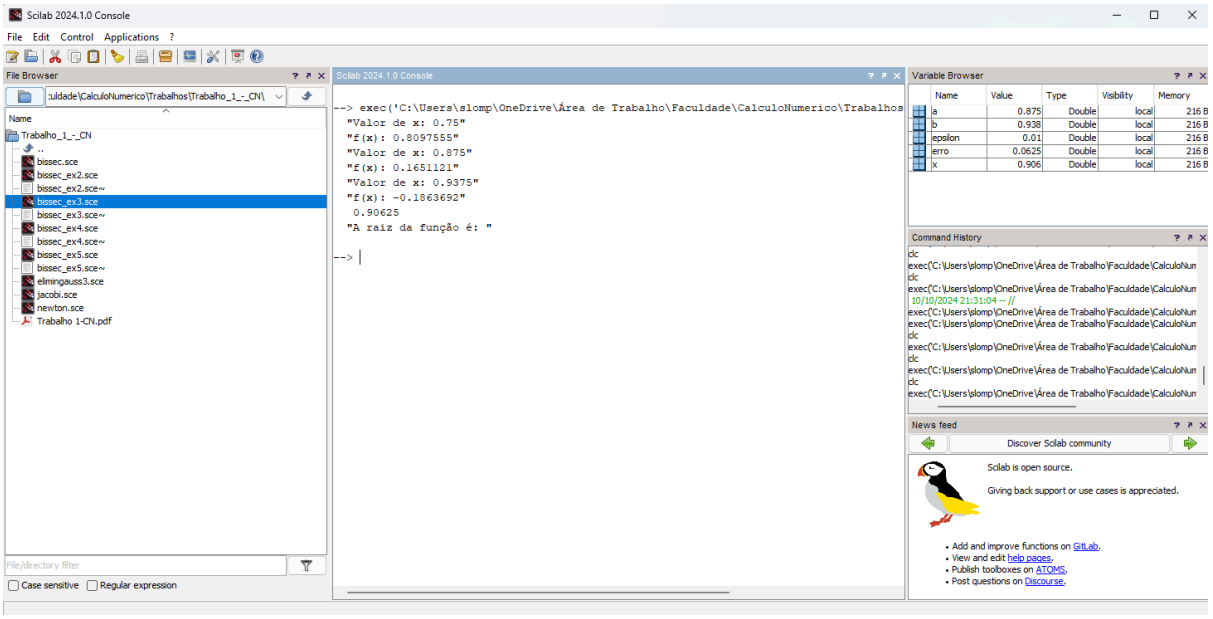
Questão 3:

Código:

bissec.sce | bissec_ex2.sce | bissec_ex3.sce | bissec_ex4.sce | bissec_ex5.sce

```
8
9  deff('y=f(x)','y=4*cos(x)-exp(x)');
10 a=0.5;
11 b=1;
12 epsilon=0.01;
13 x=(a+b)/2;
14 erro=(b-a);
15 while abs(f(x)) > epsilon
16     disp('Valor de x: '+ string(x))
17     disp('f(x): ' + string(f(x)))
18     if f(a)*f(x) < 0
19         b=x;
20     else
21         a=x;
22     end
23     x=(a+b)/2;
24     erro=(b-a);
25 end
26 disp(x, 'A raiz da função é: ')
```

Print:



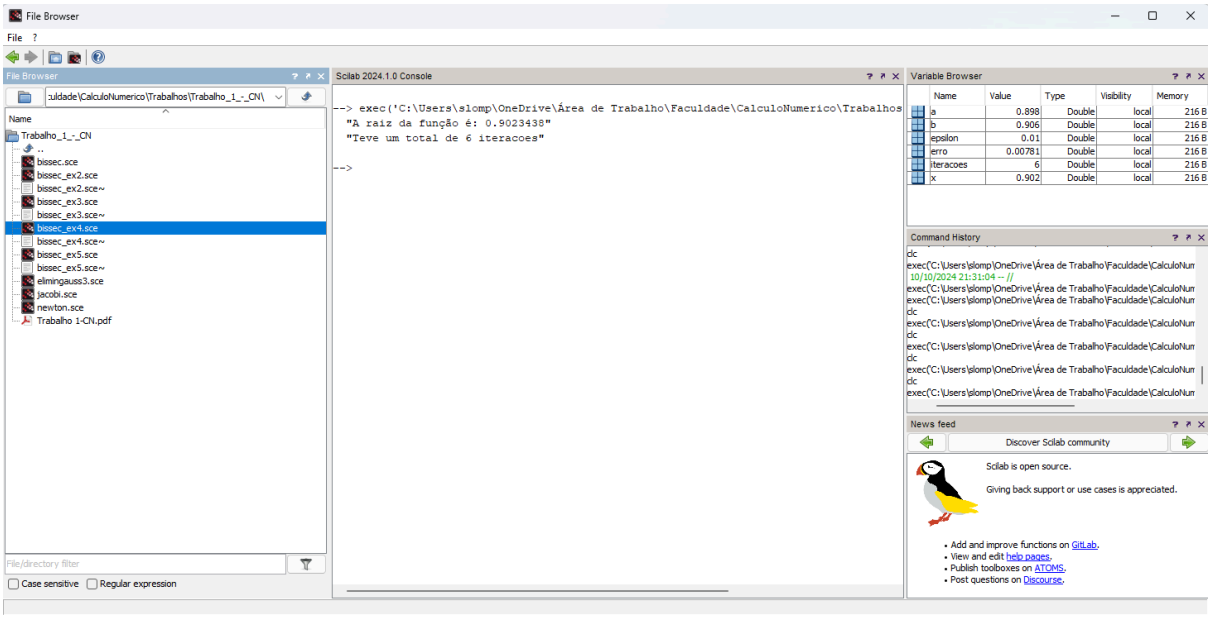
Questão 4:

Código:

bissec.sce | bissec_ex2.sce | bissec_ex3.sce | bissec_ex4.sce | bissec_ex5.sce

```
deff('y=f(x)','y=4*cos(x)-exp(x)');
a=0.5;
b=1;
epsilon=0.01;
x=(a+b)/2;
erro=(b-a);
iteracoes = 0;
while erro > epsilon
    iteracoes = iteracoes + 1;
    if f(a)*f(x) < 0
        b=x;
    else
        a=x;
    end
    x=(a+b)/2;
    erro=(b-a);
end
disp('A raiz da função é: ' + string(x))
disp('Teve um total de ' + string(iteracoes) + ' iteracoes')
```

Print:



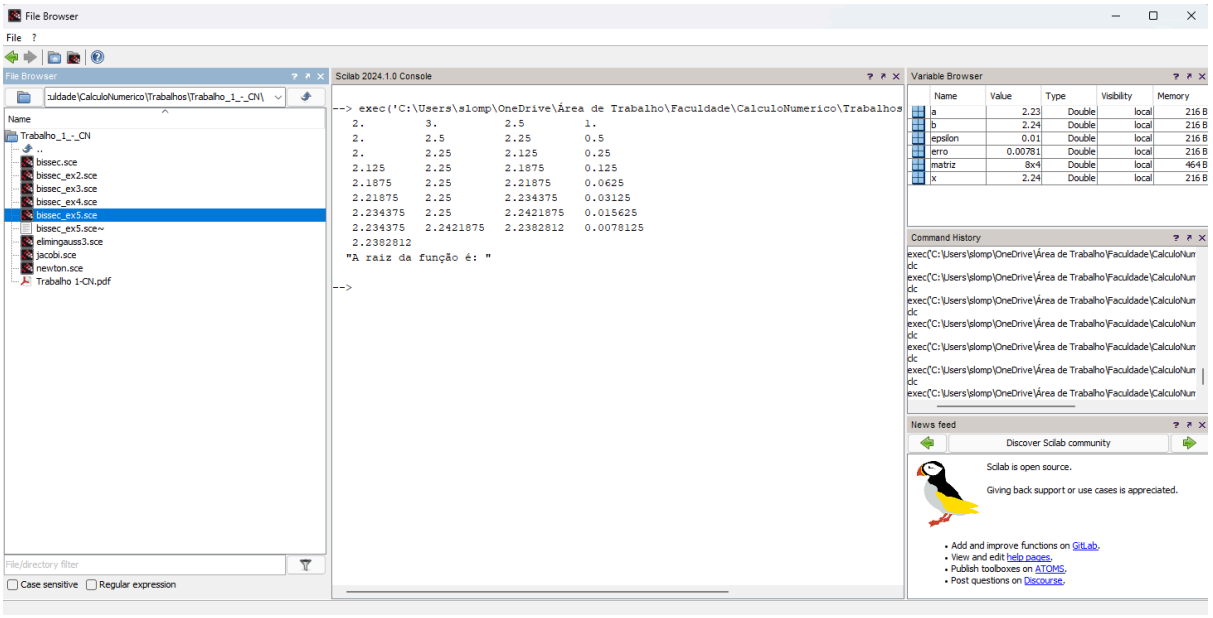
Questão 5:

Código:

bissec.sce | bissec_ex2.sce | bissec_ex3.sce | bissec_ex4.sce | bissec_ex5.sce

```
deff('y=f(x)','y=4*cos(x)-exp(x)');
a=0.5;
b=1;
epsilon=0.01;
x=(a+b)/2;
erro=(b-a);
matriz = [];
//matriz=['a', 'b', 'x', 'b-a'; a,b,x,erro];
while erro > epsilon
    if f(a)*f(x) < 0
        b=x;
    else
        a=x;
    end
    x=(a+b)/2;
    erro=(b-a);
    matriz = [matriz; a, b, x, abs(b-a)];
end
disp(matriz)
disp(x, 'A raiz da função é: ')
```

Print:


File Browser
File ?
Scilab 2024.1.0 Console
--> exec('C:\Users\slomp\OneDrive\Área de Trabalho\Faculdade\CalculoNumerico\Trabalhos
2. 3. 2.5 1.
2. 2.5 2.25 0.5
2. 2.25 2.125 0.25
2.125 2.25 2.1875 0.125
2.1875 2.25 2.21875 0.0625
2.21875 2.25 2.234375 0.03125
2.234375 2.25 2.2421875 0.015625
2.234375 2.2421875 2.2382812 0.0078125
2.2382812
"A raiz da função é: "
-->
Variable Browser
Name Value Type Visibility Memory
a 2.23 Double local 216 B
b 2.24 Double local 216 B
epsilon 0.01 Double local 216 B
erro 0.00781 Double local 216 B
matriz 8x4 Double local 464 B
x 2.24 Double local 216 B
Command History
News feed
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Add and improve functions on GitLab.
View and edit help pages.
Publish toolboxes on ATOMS.
Post questions on Discourse.

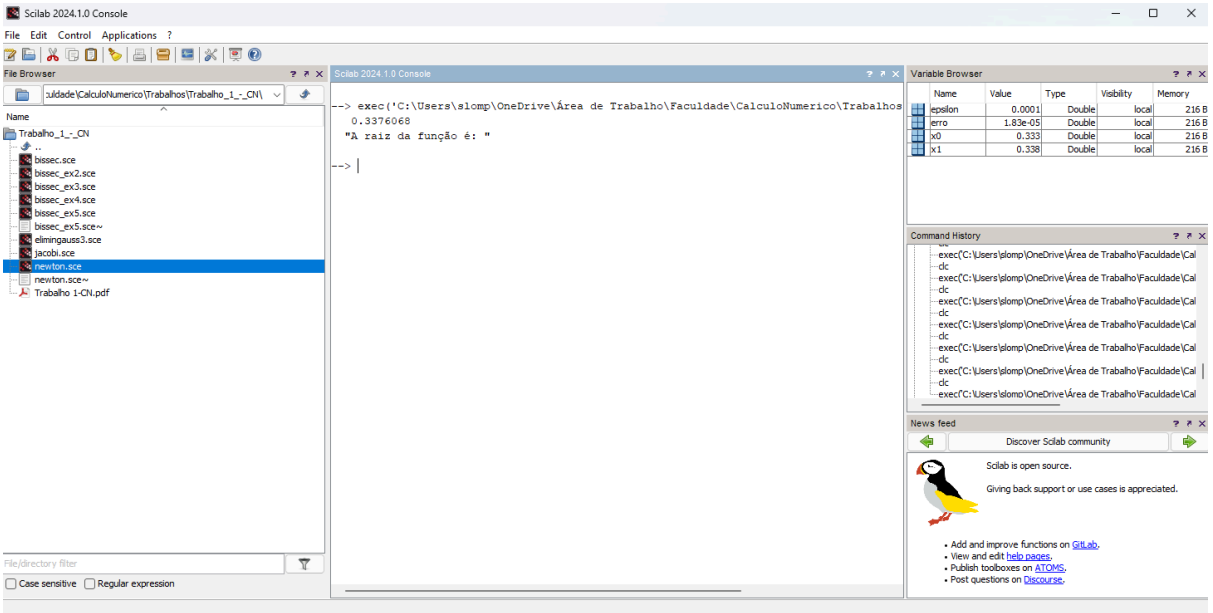
Questão 6:

Código:

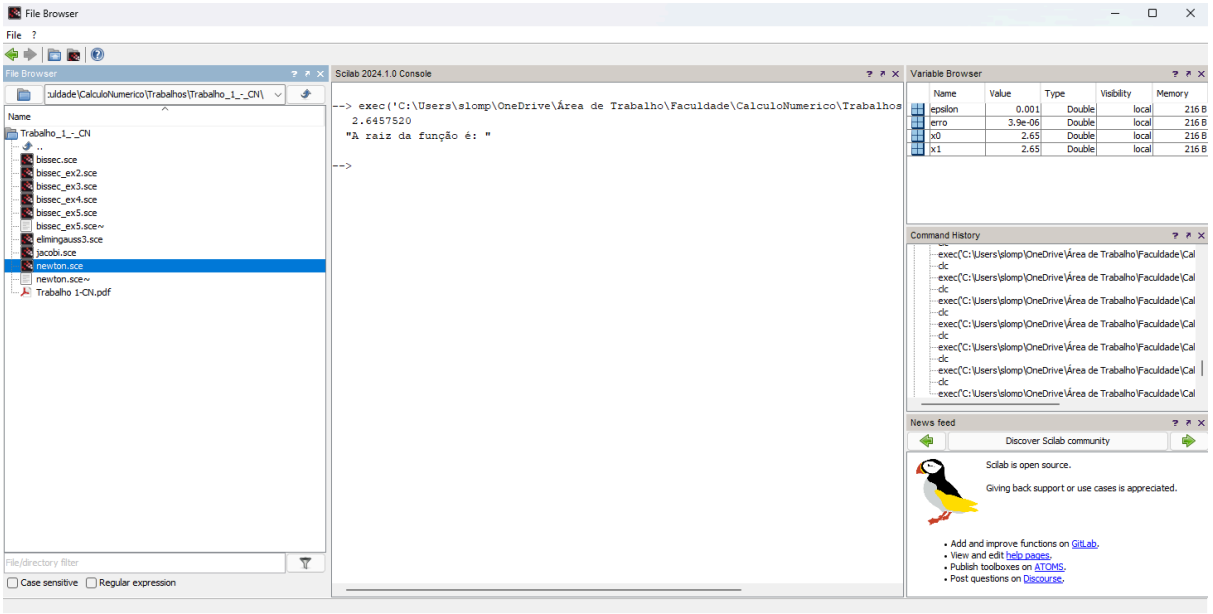
newton.sce

```
9
10 deff('y=f(x)','y=x^2-5');
11 deff('ylinha=g(x)','ylinha=2*x');
12
13 x0=3;
14
15 epsilon=0.01;
16
17 x1=x0-f(x0)/g(x0);
18
19 erro=abs(f(x1));
20
21 while erro > epsilon
22     x0=x1;
23     x1=x0-f(x0)/g(x0);
24     erro=abs(f(x1));
25 end
26
27 disp(x1, 'A raiz da função é: ')
28
```

a)



b)


File Browser
File ?
Scilab 2024.1.0 Console
--> exec('C:\Users\slomp\OneDrive\Área de Trabalho\Faculdade\CalculoNumerico\Trabalhos
2.6457520
"A raiz da função é: "
-->
Variable Browser
Name Value Type Visibility Memory
epsilon 0.001 Double local 216 B
erro 3.9e-06 Double local 216 B
x0 2.65 Double local 216 B
x1 2.65 Double local 216 B
Command History
News feed
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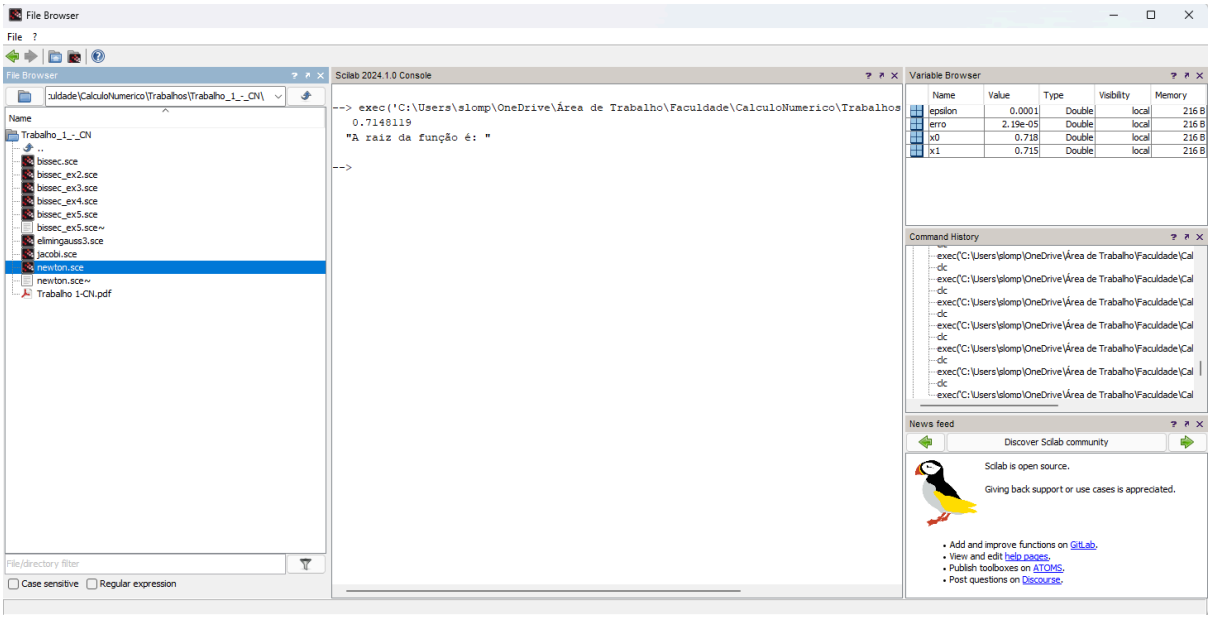
Trabalho_1_-_CN
bissec.sce
bissec_ex2.sce
bissec_ex3.sce
bissec_ex4.sce
bissec_ex5.sce
bissec_ex5.sce~
eliminagauss3.sce
jacobi.sce
newton.sce
newton.sce~
Trabalho 1-CN.pdf
Case sensitive
Regular expression

c)


File Browser
File ?
Scilab 2024.1.0 Console
--> exec('C:\Users\slomp\OneDrive\Área de Trabalho\Faculdade\CalculoNumerico\Trabalhos
0.7148119
"A raiz da função é: "
-->
Variable Browser
Name Value Type Visibility Memory
epsilon 0.0001 Double local 216 B
erro 2.19e-05 Double local 216 B
x0 0.718 Double local 216 B
x1 0.715 Double local 216 B
Command History
News feed
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Trabalho_1_-_CN
bissec.sce
bissec_ex2.sce
bissec_ex3.sce
bissec_ex4.sce
bissec_ex5.sce
bissec_ex5.sce~
eliminagauss3.sce
jacobi.sce
newton.sce
newton.sce~
Trabalho 1-CN.pdf
Case sensitive
Regular expression

Questão 7:

Código:

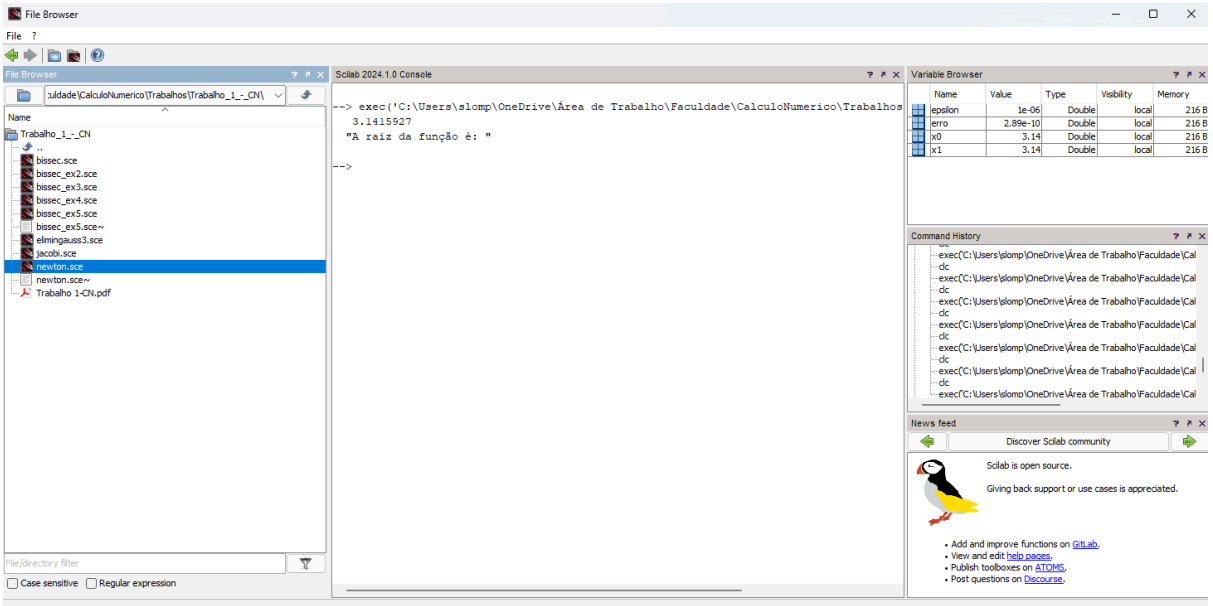
newton.sce

```
12
13 deff('y=f(x)','y=sin(x)');
14 deff('ylinha=g(x)','ylinha=cos(x)');
15
16 x0=3;
17
18 epsilon=0.000001;
19
20 x1=x0-f(x0)/g(x0);
21
22 erro=abs(f(x1));
23
24 while erro > epsilon
25     x0=x1;
26     x1=x0-f(x0)/g(x0);
27     erro=abs(f(x1));
28 end
29
30 disp(x1, 'A raiz da função é: ')
31
```

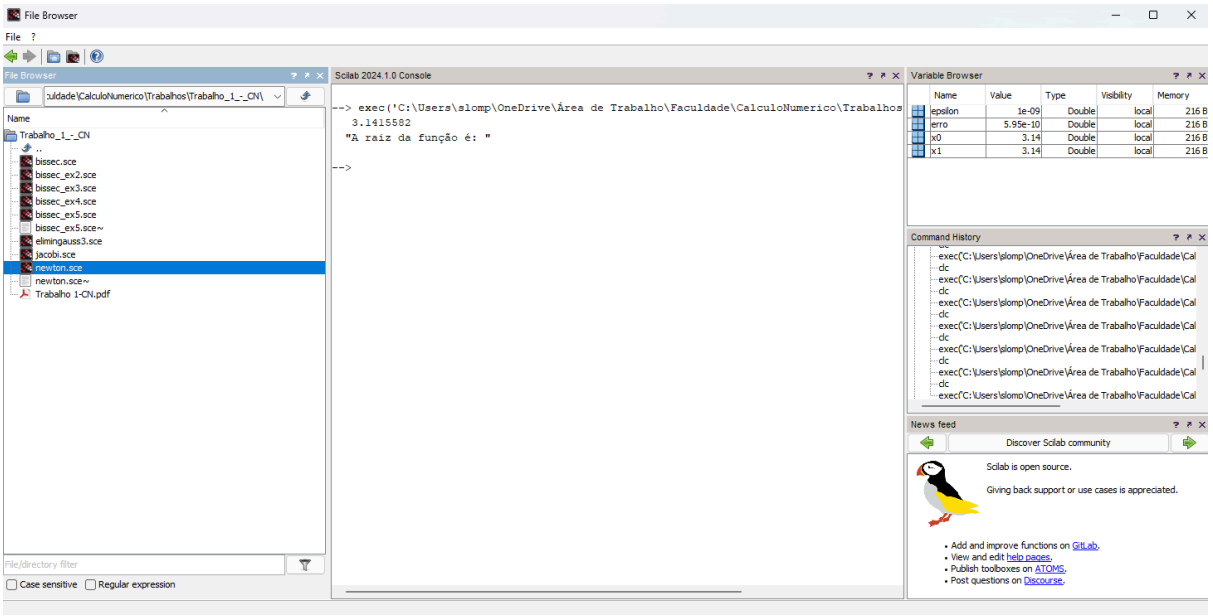
Line 18, Column 15.

Print:

sen(x) -> Precisou de erro = 10^-6 para aproximar



cos(x) + 1 -> Precisou de erro = 10^-9 para aproximar



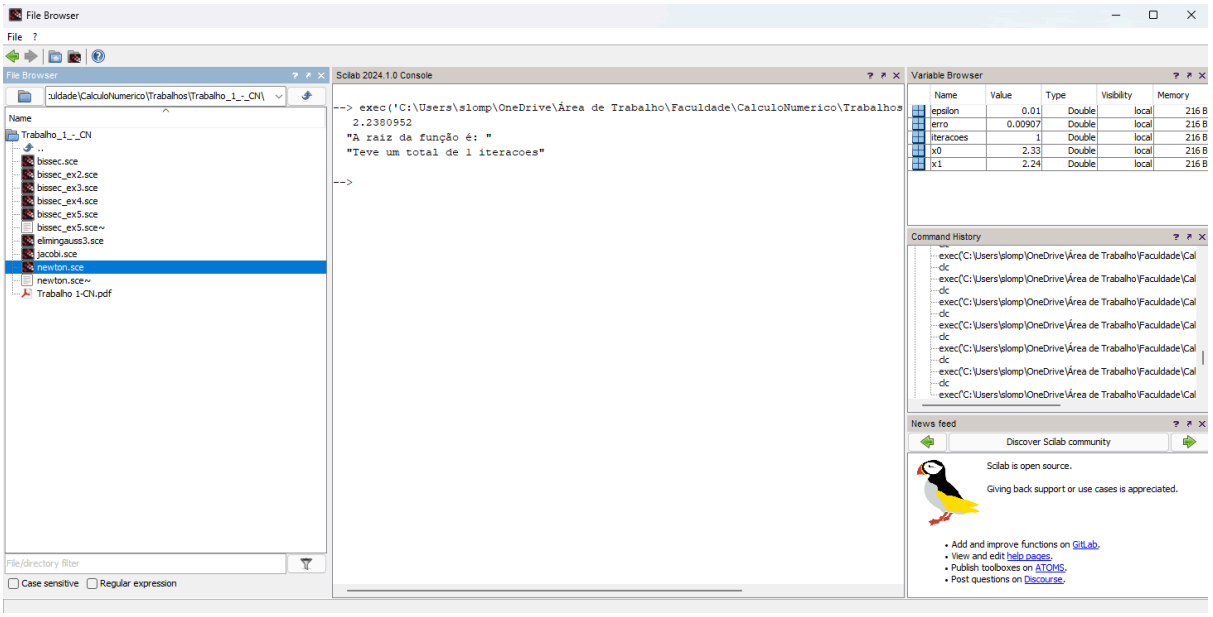
Questão 8:

Código:

newton.sce

```
9
10 deff('y=f(x)','y=x^2-5');
11 deff('ylinha=g(x)','ylinha=2*x');
12
13 x0=3;
14 epsilon=0.01;
15 x1=x0-f(x0)/g(x0);
16 iteracoes = 0
17 erro=abs(f(x1));
18
19 while erro > epsilon
20     iteracoes = iteracoes + 1
21     x0=x1;
22     x1=x0-f(x0)/g(x0);
23     erro=abs(f(x1));
24 end
25
26 disp(x1, 'A raiz da função é: ')
27 disp('Teve um total de ' + string(iteracoes) + ' iteracoes')
```

Print:



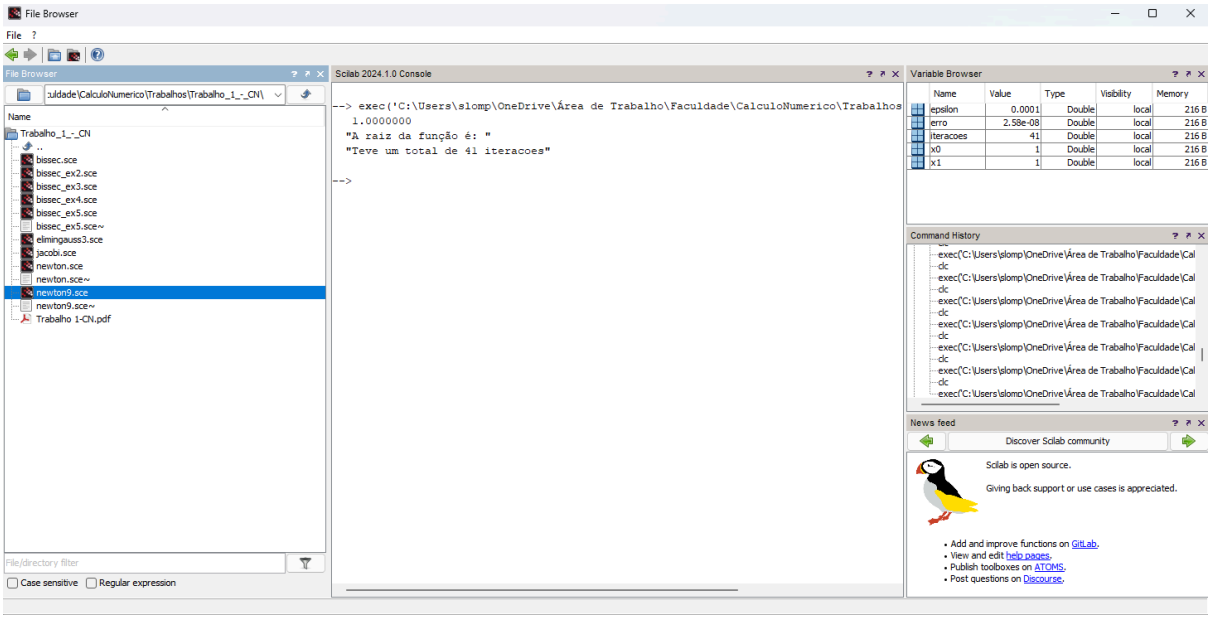
Questão 9:

Código:

newton.sce | newton9.sce

```
deff('y=f(x)','y=x**10 -1');
deff('ylinha=g(x)','ylinha=10*x**9');

x0=0.5;
epsilon=0.0001;
x1=x0-f(x0)/g(x0);
iteracoes = 0
erro=abs(f(x1));

while erro > epsilon
    iteracoes = iteracoes + 1
    x0=x1;
    x1=x0-f(x0)/g(x0);
    erro=abs(f(x1));
end

disp(x1, 'A raiz da função é: ')
disp('Teve um total de ' + string(iteracoes) + ' iteracoes')

```

Print:



Explicação: Foram necessárias 41 iterações. O código é lento por conta de que há operação exponencial e, executá-las 41 vezes pode causar lentidão no computador.

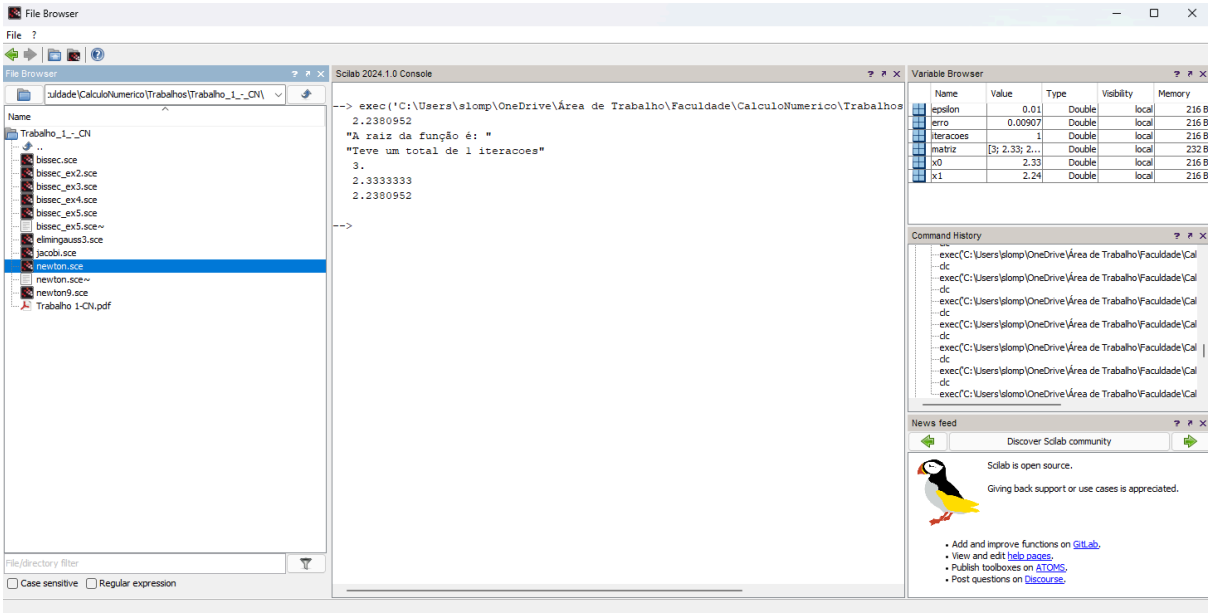
Questão 10:

Código:

newton.sce | bissec_ex5.sce

```
deff('y=f(x)','y=x^2-5');
deff('ylinha=g(x)','ylinha=2*x');

x0=3;
epsilon=0.01;
x1=x0-f(x0)/g(x0);
iteracoes = 0
erro=abs(f(x1));
matriz = [x0];
while erro > epsilon
    iteracoes = iteracoes + 1;
    x0=x1;
    x1=x0-f(x0)/g(x0);
    erro=abs(f(x1));
    matriz = [matriz; x0];
end
matriz = [matriz; x1];
disp(x1, 'A raiz da função é: ')
disp('Teve um total de ' + string(iteracoes) + ' iteracoes')
disp(matriz)
```

Print:



Questão 11:

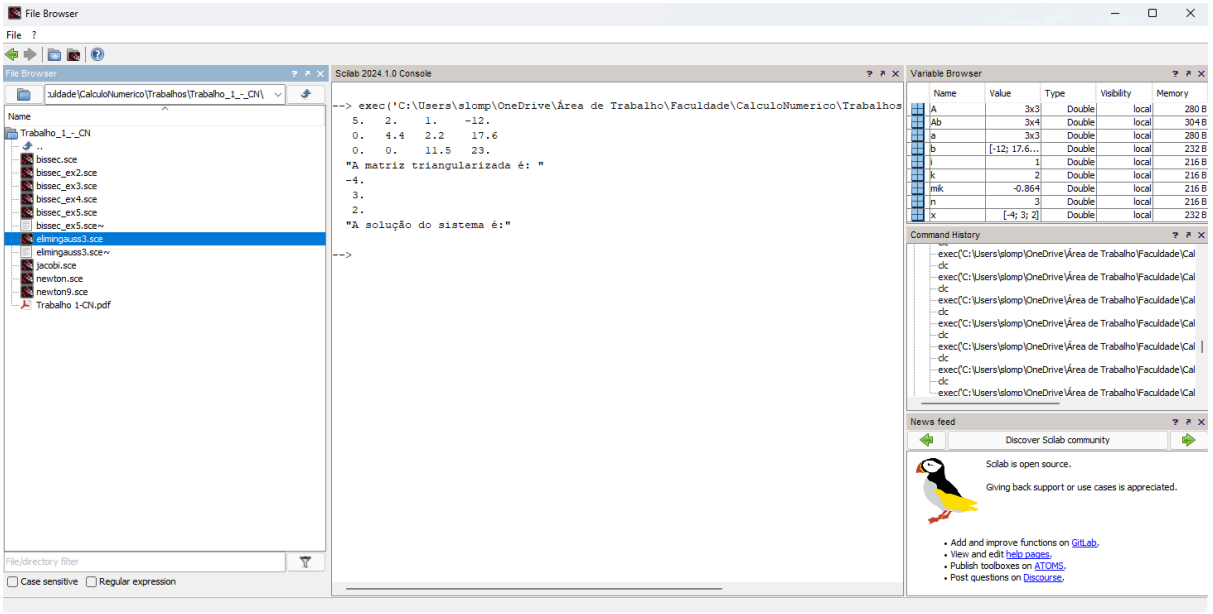
Código:

bissec_ex5.sce | elimingauss3.sce

```
1  clear
2
3  //Eliminação Gaussiana 3 (pode ter pivô nulo)
4  //Entradas
5  A = [5 2 1; -1 4 2; 2 -3 10];
6  b = [-12; 20; 3];
7
8  //Matriz aumentada
9  Ab = [A b];
```

Coloquei apenas as entradas.

Print:



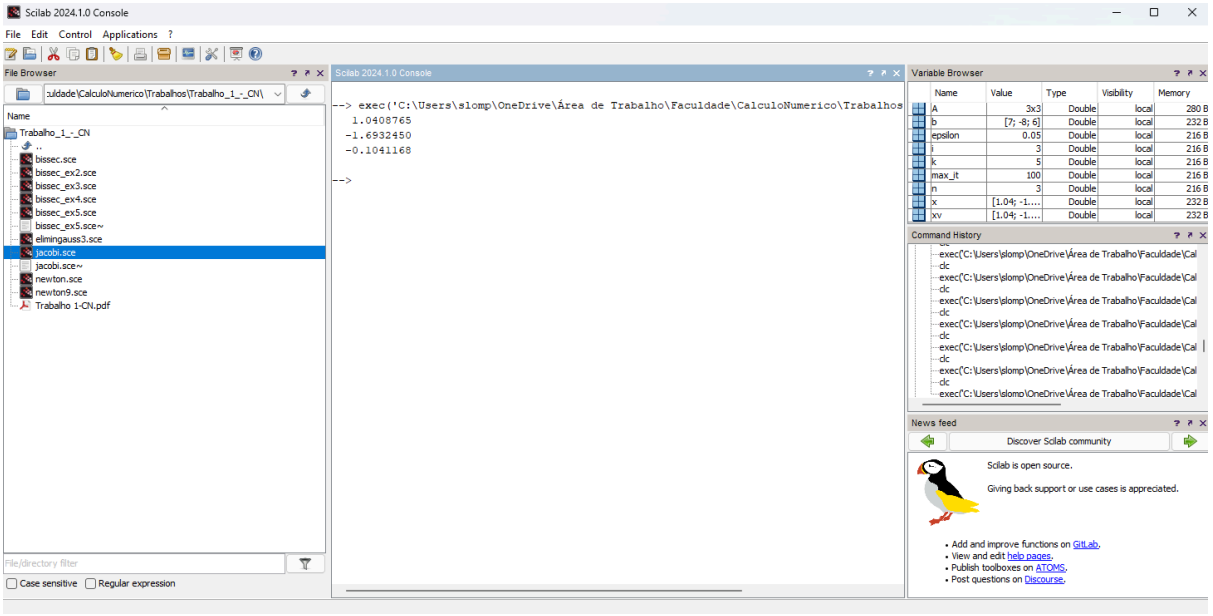
Questão 12:

Código:

bissec_ex5.sce | jacobi.sce

```
//Entradas
A = [10 2 1; -1 4 2; 2 -3 10];
b = [7; -8; 6];
epsilon = 0.05;
xv=[0.7; -1.6; 0.6];
max_it=100;

n=size(A,1); // número de linhas (número de equações)
for k=1:max_it
    for i=1:n //processo iterativo de Jacobi
        x(i)=(b(i)-(sum(A(i,1:n)*xv(1:n))-A(i,i)*xv(i)))
/A(i,i);
    end

    if max(abs(x-xv))<epsilon
        disp(x)
        break
    else
        xv=x;
    end

    if k == max_it
        disp(x, 'após o número máximo de iterações cheg
amos a')
    end
end

```

Print:


Scilab 2024.1.0 Console
File Edit Control Applications ?
File Browser
Trabalho_1_-_CN
bissec.sce
bissec_ex2.sce
bissec_ex3.sce
bissec_ex4.sce
bissec_ex5.sce
bissec_ex5.sce~
eliminagauss3.sce
jacobi.sce
jacobi.sce~
newton.sce
newton9.sce
Trabalho 1-CN.pdf
Case sensitive
Regular expression
Scilab 2024.1.0 Console
--> exec('C:\Users\slomp\OneDrive\Área de Trabalho\Faculdade\CalculoNumerico\Trabalhos
1.0408765
-1.6932450
-0.1041168
-->
Variable Browser
Name Value Type Visibility Memory
A 3x3 Double local 280 B
b [7; -8; 6] Double local 232 B
epsilon 0.05 Double local 216 B
i 3 Double local 216 B
k 5 Double local 216 B
max_it 100 Double local 216 B
n 3 Double local 216 B
x [1.04; -1.... Double local 232 B
xv [1.04; -1.... Double local 232 B
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Add and improve functions on GitLab.
View and edit help pages.
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