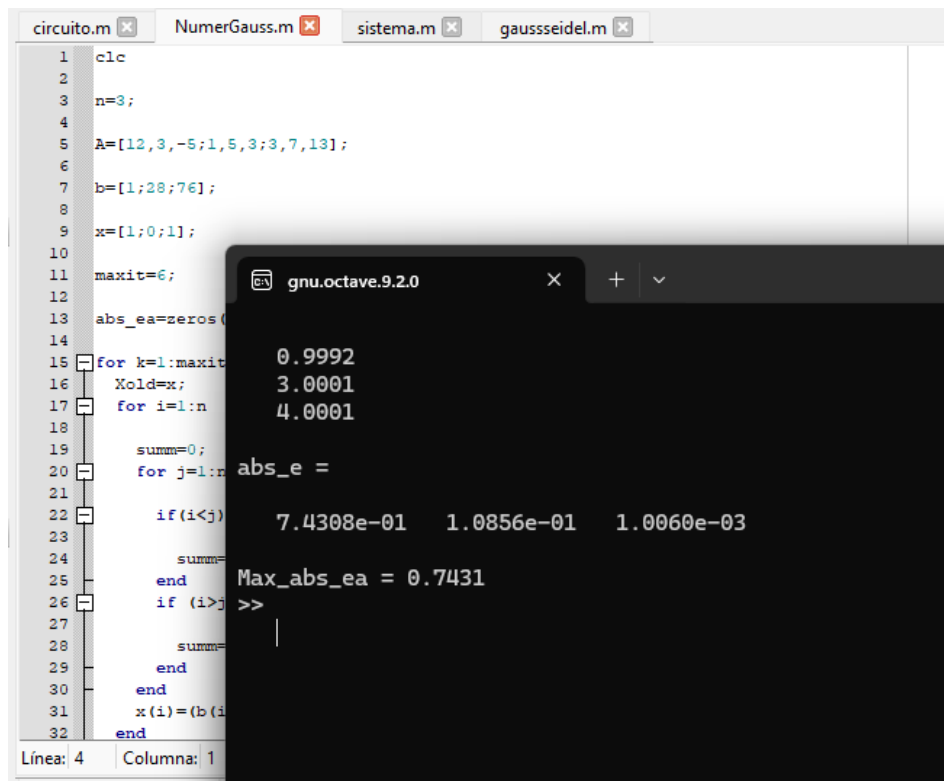


# Taller Grupal

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## Gauss



The image shows a MATLAB script named 'NumerGauss.m' and its execution output in the command window. The script implements the Gauss-Seidel method for solving a system of linear equations  $Ax = b$ . It starts by clearing the workspace and setting  $n=3$ . The coefficient matrix  $A$  and the right-hand side vector  $b$  are defined as  $A = \begin{bmatrix} 12 & 3 & -5 \\ 1 & 5 & 3 \\ 3 & 7 & 13 \end{bmatrix}$  and  $b = [1; 28; 76]$ . The initial guess  $x$  is  $[1; 0; 1]$ . A maximum of 6 iterations is set. The script then enters a loop where it calculates the absolute error for each variable and updates the values of  $x$  using the Gauss-Seidel formula. The output shows the absolute error for each variable after 6 iterations:  $0.9992$ ,  $3.0001$ , and  $4.0001$ . The maximum absolute error is  $0.7431$ .

```
1 clear
2
3 n=3;
4
5 A=[12,3,-5;1,5,3;3,7,13];
6
7 b=[1;28;76];
8
9 x=[1;0;1];
10
11 maxit=6;
12
13 abs_e=zeros(1,n);
14
15 for k=1:maxit
16     xold=x;
17     for i=1:n
18
19         sum=0;
20         for j=1:n
21
22             if (i<j)
23                 sum=sum+A(i,j)*x(j);
24             end
25         end
26         if (i>j)
27             sum=sum+A(i,j)*xold(j);
28         end
29         x(i)=(b(i)-sum)/A(i,i);
30     end
31 end
32
```

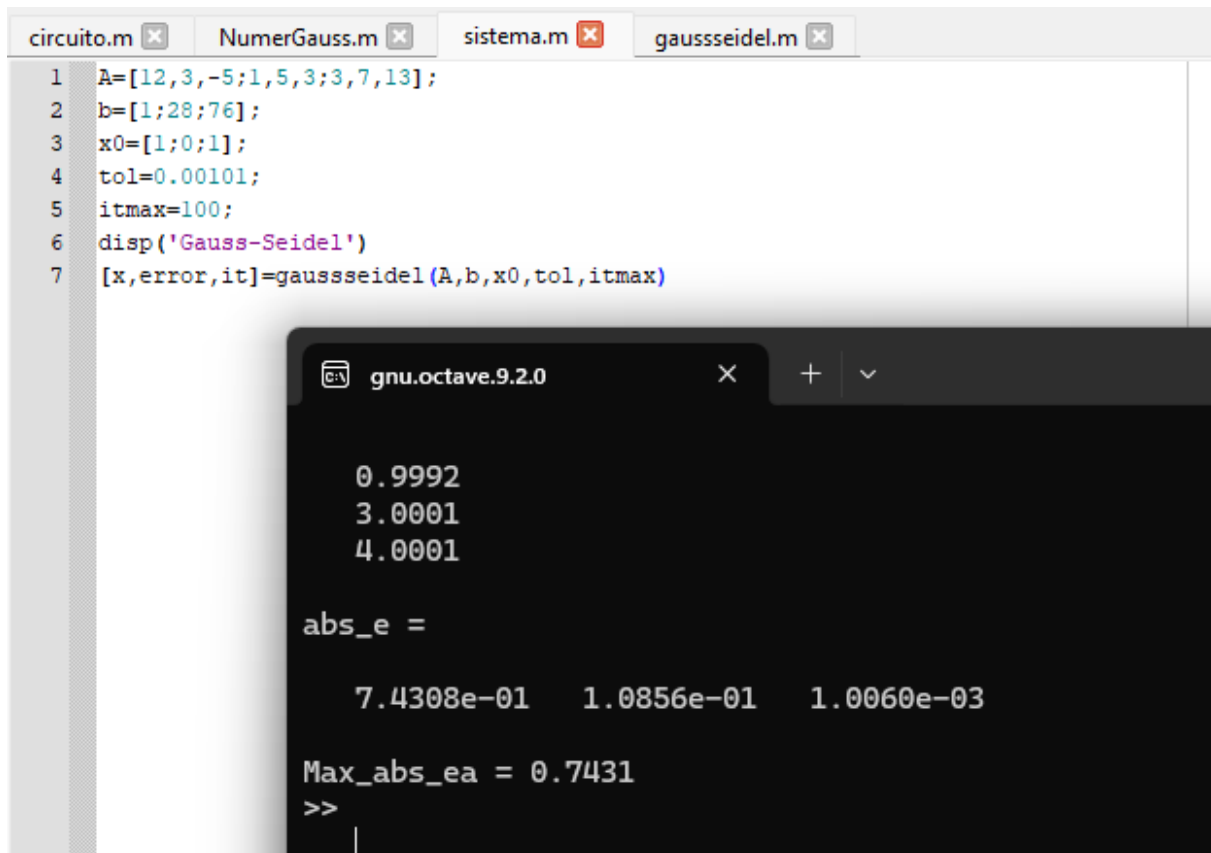
Output:

```
0.9992
3.0001
4.0001
abs_e =
    7.4308e-01    1.0856e-01    1.0060e-03
Max_abs_e = 0.7431
>>
```

## Conclusiones:

- En cada iteración se calcula el error absoluto relativo para cada variable, lo que nos permite garantizar la precisión de las salidas o respuestas
- Para comprobar la eficacia del método tenemos que comprobar que los errores se reducen de manera progresiva, a lo largo del código

## Gauss Seidel



The image shows a MATLAB/Octave environment with four tabs: 'circuito.m', 'NumerGauss.m', 'sistema.m', and 'gaussseidel.m'. The 'gaussseidel.m' tab is active, displaying the following code:

```
1 A=[12,3,-5;1,5,3;3,7,13];
2 b=[1;28;76];
3 x0=[1;0;1];
4 tol=0.00101;
5 itmax=100;
6 disp('Gauss-Seidel')
7 [x,error,it]=gaussseidel(A,b,x0,tol,itmax)
```

Below the code editor, a command window titled 'gnu.octave.9.2.0' shows the output of the script:

```
0.9992
3.0001
4.0001

abs_e =

    7.4308e-01    1.0856e-01    1.0060e-03

Max_abs_ea = 0.7431
>>
```

## Conclusiones:

- El código utiliza la diferencia entre el producto  $Ax-b$  para medir el error relativo
- Se establece un número máximo de iteraciones, definido por el usuario con la variable `itmax`