

gauss_Elimination_ID_007.m ×

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/MATLAB Drive/gauss_Elimination_ID_007.m

```

1      n = input('Please Enter the size of the equation system n = ');
2      C = input('Please Enter the elements of the Matrix C ');
3      b = input('Please Enter the elements of the Matrix b ');
4      dett = det(C)
5      if dett == 0
6          print('This system unsolvable because det(C) = 0 ')
7      else
8          b = b'
9          A = [ C b ]
10         for j = 1:(n-1)
11             for i= (j+1) : n
12                 mult = A(i,j)/A(j,j) ;
13                 for k= j:n+1
14                     A(i,k) = A(i,k) - mult*A(j,k) ;
15                 end
16             end
17         end
18     end
19     for p = n:-1:1
20         for r = p+1:n
21             x(p) = A(p,r)/A(p,r-1)
22         end
23     end
24 end

```

Command Window

```

>> gauss_Elimination_ID_007
Please Enter the size of the equation system n =
3
Please Enter the elements of the Matrix C
[1 2 1; 1 1 2; -1 1 1]
Please Enter the elements of the Matrix b
[0 5 0]

dett =

    -5

```

Command Window

b =

$$\begin{bmatrix} 0 \\ 5 \\ 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 1 & 1 & 2 & 5 \\ -1 & 1 & 1 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & 1 & 2 & 5 \\ -1 & 1 & 1 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 2 & 5 \\ -1 & 1 & 1 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ -1 & 1 & 1 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ -1 & 1 & 1 & 0 \end{bmatrix}$$

Command Window

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ 0 & 1 & 1 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ 0 & 3 & 1 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ 0 & 3 & 2 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ 0 & 3 & 2 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ 0 & 0 & 2 & 0 \end{bmatrix}$$

A =

$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 0 & -1 & 1 & 5 \\ 0 & 0 & 5 & 0 \end{bmatrix}$$

gauss_Elimination_ID_007.m

Command Window

A =

1	2	1	0
0	-1	1	5
0	0	5	15

x =

0	-1
---	----

x =

2	-1
---	----

x =

0.5000	-1.0000
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>>

```

A = input('Enter a coefficient matrix A: ');
B = input('Enter source vector B: ');
P = input('Enter initial guess vector: ');
n = input('Enter number of iterations: ');
e = input('Enter tolerance: ');
N = length(B);
X = zeros(N, 1);

for j = 1:n
    for i = 1:N
        X(i) = (B(i) / A(i,i)) - (A(i,[1:i-1,i+1:N]) * P([1:i-1,i+1:N])) / A(i,i);
        P(i) = X(i);
    end
    fprintf('Iteration no %d\n', j)
    disp(X)

    % Check convergence criterion
    if norm(X - P) < e
        fprintf('Converged at iteration %d\n', j);
        break;
    end
end

```

Enter a coefficient matrix A:

[4 2 -2;1 -3 -1;3 -1 4]

Enter source vector B:

[0;7;5]

Enter initial guess vector:

[0;0;0]

Enter number of iterations:

5

Enter tolerance:

0.0001

Iteration no 1

```

    0
   -2.3333
    0.6667

```

Converged at iteration 1

>>

```

        break;
    end

    P = X; % Update the previous solution for the next iteration
end

```