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SE-Comps B/Batch C

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Scilab no.3: Row Echelon Form

Program No.1 :- Write a Sci-Lab code to convert given matrix to row echelon form:

$$A = \begin{bmatrix} 1 & 2-1 & 3 \\ 3 & -1 & 2 & 1 \\ 2 & -2 & 3 & 2 \\ 1 & -1 & 1 & -1 \end{bmatrix}$$

Code :-

```
clc
A=[1 2 -1 3;3 -1 2 1;2 -2 3 2;1 -1 1 -1];
printf("Original matrix is:");
disp(A);
n=4;
for i=1:n
  if A(i,i)==0
    A(i,:)=A(i,:)
  else
    A(i,:)=A(i,:)/A(i,i);
disp(A)
  for j=1:n-1
    if i+j<n+1
      A(i+j,:)=A(i+j,:)-A(i+j,i)*A(i,:)
    else
    end
  end
end
if A(1,2)== A(2,2)
  A(1,:)=A(1,:)-A(2,:)
else
  end
disp(A)
end
```

Output :-

```
Scilab 6.1.1 Console
Original matrix is:
   1.    2.   -1.    3.
   3.   -1.    2.    1.
   2.   -2.    3.    2.
   1.   -1.    1.   -1.

   1.    2.   -1.    3.
   3.   -1.    2.    1.
   2.   -2.    3.    2.
   1.   -1.    1.   -1.

   1.    2.   -1.    3.
   0.   -7.    5.   -8.
   0.   -6.    5.   -4.
   0.   -3.    2.   -4.

   1.    2.   -1.             3.
   0.    1.   -0.7142857   1.1428571
   0.   -6.    5.            -4.
   0.   -3.    2.            -4.

   1.    2.   -1.             3.
   0.    1.   -0.7142857   1.1428571
   0.    0.    0.7142857   2.8571429
   0.    0.   -0.1428571  -0.5714286

   1.    2.   -1.             3.
   0.    1.   -0.7142857   1.1428571
   0.    0.    1.            4.
   0.    0.   -0.1428571  -0.5714286

   1.    2.   -1.             3.
   0.    1.   -0.7142857   1.1428571
   0.    0.    1.            4.
   0.    0.    0.           -6.661D-16

   1.    2.   -1.             3.
   0.    1.   -0.7142857   1.1428571
   0.    0.    1.            4.
   0.    0.    0.            1.

   1.    2.   -1.             3.
   0.    1.   -0.7142857   1.1428571
   0.    0.    1.            4.
   0.    0.    0.            1.

-->
```

Program No. 2:- Write a Sci-Lab code using for loop to convert given matrix to row echelon form:

$$A = \begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 4 \\ 2 & 5 & 11 & 6 \end{bmatrix}$$

Code:-

```
clc
A=[2 -1 3 4;0 3 4 1;2 3 7 4;2 5 11 6];
printf("Original matrix is:");
disp(A);
n=4;
for i=1:n
    if A(i,i)==0
        A(i,:)=A(i,:)
    else
        A(i,:)=A(i,:)/A(i,i);
disp(A)
        for j=1:n-1
            if i+j<n+1
                A(i+j,:)=A(i+j,:)-A(i+j,i)*A(i,:)
            else
            end
        end
    end
    if A(1,2)== A(2,2)
        A(1,:)=A(1,:)-A(2,:)
    else
    end
disp(A)
end
```

Output :-

```
Scilab 6.1.1 Console
Original matrix is:
   2.   -1.    3.     4.
   0.    3.    4.     1.
   2.    3.    7.     4.
   2.    5.   11.     6.


   1.   -0.5   1.5    2.
   0.    3.    4.     1.
   2.    3.    7.     4.
   2.    5.   11.     6.


   1.   -0.5   1.5    2.
   0.    3.    4.     1.
   0.    4.    4.     0.
   0.    6.    8.     2.


   1.   -0.5   1.5             2.
   0.    1.    1.3333333   0.3333333
   0.    4.    4.             0.
   0.    6.    8.             2.


   1.   -0.5   1.5             2.
   0.    1.    1.3333333   0.3333333
   0.    0.   -1.3333333  -1.3333333
   0.    0.    0.             0.


   1.   -0.5   1.5             2.
   0.    1.    1.3333333   0.3333333
   0.    0.    1.             1.
   0.    0.    0.             0.


   1.   -0.5   1.5             2.
   0.    1.    1.3333333   0.3333333
   0.    0.    1.             1.
   0.    0.    0.             0.


   1.   -0.5   1.5             2.
   0.    1.    1.3333333   0.3333333
   0.    0.    1.             1.
   0.    0.    0.             0.


-->|
```

Program No. 3 :- Write a Scilab code to convert the given matrix to row echelon form

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

Code :-

```
clc
A=[1 2 3 -1;-2 -1 -3 -1;1 0 1 1;0 1 1 -1];
printf("Original matrix is:");
disp(A);
n=4;
for i=1:n
    if A(i,i)==0
        A(i,:)=A(i,:)
    else
        A(i,:)=A(i,:)/A(i,i);
disp(A)
        for j=1:n-1
            if i+j<n+1
                A(i+j,:)=A(i+j,:)-A(i+j,i)*A(i,:)
            else
            end
        end
    end
    if A(1,2)== A(2,2)
        A(1,:)=A(1,:)-A(2,:)
    else
    end
disp(A)
end
```

Output :-

```
Original matrix is:
   1.    2.    3.   -1.
  -2.   -1.   -3.   -1.
   1.    0.    1.    1.
   0.    1.    1.   -1.


   1.    2.    3.   -1.
  -2.   -1.   -3.   -1.
   1.    0.    1.    1.
   0.    1.    1.   -1.


   1.    2.    3.   -1.
   0.    3.    3.   -3.
   0.   -2.   -2.    2.
   0.    1.    1.   -1.


   1.    2.    3.   -1.
   0.    1.    1.   -1.
   0.   -2.   -2.    2.
   0.    1.    1.   -1.


   1.    2.    3.   -1.
   0.    1.    1.   -1.
   0.    0.    0.    0.
   0.    0.    0.    0.


   1.    2.    3.   -1.
   0.    1.    1.   -1.
   0.    0.    0.    0.
   0.    0.    0.    0.


   1.    2.    3.   -1.
   0.    1.    1.   -1.
   0.    0.    0.    0.
   0.    0.    0.    0.

--> |
```

Program no. 4 :- Write a Scilab code to convert the given matrix to row echelon form

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 4 \\ 1 & 4 & 10 \end{bmatrix}$$

Code :-

```
clc
A=[1 1 1;1 2 4;1 4 10];
printf("Original matrix is:");
disp(A);
n=3;
for i=1:n
    if A(i,i)==0
        A(i,:)=A(i,:)
    else
        A(i,:)=A(i,:)/A(i,i);
disp(A)
    for j=1:n-1
        if i+j<n+1
            A(i+j,:)=A(i+j,:)-A(i+j,i)*A(i,:)
        else
        end
    end
    end
    if A(1,2)== A(2,2)
        A(1,:)=A(1,:)-A(2,:)
    else
    end
disp(A)
end
```

Output :-

```
Scilab 6.1.1 Console
Original matrix is:
   1.   1.   1.
   1.   2.   4.
   1.   4.   10.

   1.   1.   1.
   1.   2.   4.
   1.   4.   10.

   1.   0.   -2.
   0.   1.   3.
   0.   3.   9.

   1.   0.   -2.
   0.   1.   3.
   0.   3.   9.

   1.   0.   -2.
   0.   1.   3.
   0.   0.   0.

   1.   0.   -2.
   0.   1.   3.
   0.   0.   0.

-->
```

Program No. 5 :- Write a Scilab code to convert the given matrix to row echelon form

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 5 \\ 8 & 5 & 14 & 17 \\ 1 & 5 & 5 & 7 \end{bmatrix}$$

Code :-

```
clc
A=[1 2 3 4;2 1 4 5;8 5 14 17;1 5 5 7];
printf("Original matrix is:");
disp(A);
n=4;
for i=1:n
    if A(i,i)==0
        A(i,:)=A(i,:)
    else
        A(i,:)=A(i,:)/A(i,i);
disp(A)
        for j=1:n-1
            if i+j<n+1
                A(i+j,:)=A(i+j,:)-A(i+j,i)*A(i,:)
            else
            end
        end
    end
    if A(1,2)== A(2,2)
        A(1,:)=A(1,:)-A(2,:)
    else
    end
disp(A)
end
```

Output :-

```
Scilab 6.1.1 Console
Original matrix is:
   1.    2.    3.    4.
   2.    1.    4.    5.
   8.    5.    14.   17.
   1.    5.    5.    7.


   1.    2.    3.    4.
   2.    1.    4.    5.
   8.    5.    14.   17.
   1.    5.    5.    7.


   1.    2.     3.     4.
   0.   -3.    -2.    -3.
   0.  -11.   -10.   -15.
   0.    3.     2.     3.


   1.    2.    3.             4.
   0.    1.    0.6666667      1.
   0.  -11.  -10.           -15.
   0.    3.    2.             3.


   1.    2.    3.             4.
   0.    1.    0.6666667      1.
   0.    0.   -2.6666667    -4.
   0.    0.    0.             0.


   1.    2.    3.             4.
   0.    1.    0.6666667      1.
   0.    0.    1.             1.5
   0.    0.    0.             0.


   1.    2.    3.             4.
   0.    1.    0.6666667      1.
   0.    0.    1.             1.5
   0.    0.    0.             0.


   1.    2.    3.             4.
   0.    1.    0.6666667      1.
   0.    0.    1.             1.5
   0.    0.    0.             0.


-->
```