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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,:)+A(1,:);
    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
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
    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. -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.
```

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