

LU Decomposition

AIM:

To write a program to find the LU Decomposition of a matrix.

Equipments Required:

1. Hardware – PCs
2. Anaconda – Python 3.7 Installation / Moodle-Code Runner

Algorithm

1.Read the elements of augmented matrix into arrays a and b
2.Calculate elements of L and U
3.Print elements of L and U
4.Find V by solving $LV = B$ by forward substitution
5.Find X by solving $UX = V$ by backward substitution
6.Print Array X as the solution

Program:

```
'''Program to find L and U matrix using LU decomposition.
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'''

from scipy.linalg import lu
a=eval(input())
P,L,U=lu(a)
print(L)
print(U)
```

Output:

	Input	Expected	Got	
✓	[[3, 2, 7], [2, 3, 1], [3, 4, 1]]	$\begin{bmatrix} 1. & 0. & 0. \\ 1. & 1. & 0. \\ 0.66666667 & 0.83333333 & 1. \end{bmatrix}$	$\begin{bmatrix} 1. & 0. & 0. \\ 1. & 1. & 0. \\ 0.66666667 & 0.83333333 & 1. \end{bmatrix}$	✓
✓	[[5, 1, 8], [4, 5, 7], [8, 9, 1]]	$\begin{bmatrix} 1. & 0. & 0. \\ 0.625 & 1. & 0. \\ 0.5 & -0.10810811 & 1. \end{bmatrix}$	$\begin{bmatrix} 1. & 0. & 0. \\ 0.625 & 1. & 0. \\ 0.5 & -0.10810811 & 1. \end{bmatrix}$	✓

Passed all tests! ✓

Marks for this submission: 50.00/50.00.

Result:

Thus the program to find the LU Decomposition of a matrix is written and verified using python programming.