

Norm of a matrix

Aim

To write a program to find the 1-norm, 2-norm and infinity norm of the matrix and display the result in two decimal places.

Equipment's required:

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

Algorithm:

1. Get the input matrix using `np.array()`
2. Find the 2-norm of the matrix using `np.linalg.norm()`
3. Print the norm of the matrix in two decimal places.

Program:

```
# Register No: 22005042
# Developed By: M.mohammed imthiyas
# 1-Norm of a Matrix

import numpy as np

mat = np.array(eval(input()))
ans = np.linalg.norm(mat, 1)
Norm_of_matrix = "{:.2f}".format(ans)
print(Norm_of_matrix)

# 2-Norm of a Matrix

import numpy as np

mat = np.array(eval(input()))
ans = np.linalg.norm(mat, 2)
Norm_of_matrix = "{:.2f}".format(ans)
print(Norm_of_matrix)
```

```
# Infinity Norm of a Matrix
```

```
import numpy as np
```

```
mat = np.array(eval(input()))  
ans = np.linalg.norm(mat, np.inf)  
Norm_of_matrix = "{:.2f}".format(ans)  
print(Norm_of_matrix)
```

Output:

1-Norm of a Matrix

	Input	Expected	Got	
✓	<code>[[-1, 3],[3, -4],[1, 7]]</code>	14.00	14.00	✓
✓	<code>[[1, 2, 3],[-3,-4,-1],[9,6,1]]</code>	13.00	13.00	✓

Passed all tests! ✓

2-Norm of a Matrix

	Input	Expected	Got	
✓	<code>[[1,2],[3,4]]</code>	5.46	5.46	✓
✓	<code>[[-1, 3],[3, -4],[1, 7]]</code>	8.66	8.66	✓
✓	<code>[[2, 3],[3, 4],[1, 8]]</code>	9.86	9.86	✓

Passed all tests! ✓

Infinity Norm of a Matrix

	Input	Expected	Got	
✓	<code>[[-1, 3],[3, -4],[1, 7]]</code>	8.00	8.00	✓
✓	<code>[[1,2,3],[-9,-8,-3],[10,3,2]]</code>	20.00	20.00	✓

Passed all tests! ✓

Result

Thus the program for 1-norm, 2-norm and Infinity norm of a matrix are written and verified.