220801160

EX.NO: 01 NUMPY

DATE: 16/02/2024

AIM:

To calculate the values for the mathematical formulas using NumPy library

INTEGRATED DEVELOPMENT ENVIRONMENT (IDE) REQUIRED:

JUPYTER NOTEBOOK

REQUIRED LIBRARIES FOR PYTHON:

Numpy

PROCEDURE:

1. Euclidean distance

Tho mathematical tormuEa tor calcu:ating tha Euclidean distance betwaon 2 paints in 20 space:

$$,q) = \text{(Gl PI)}^2 + \text{(Qa P2)}^2$$

PROGRAM:

```
#CALCULATE EUCLIDEAN DISTANCE

import math

a = [9]
b = [1]
print (math.dist(a,b))

a = [3, 7]
b = [6, 12]
print (math.dist(a, b))
```

OUTPUT

5 .8309518948453

2.Dot Product

$$u = \begin{bmatrix} 5 \\ 12 \end{bmatrix}, \quad v = \begin{bmatrix} 8 \\ 6 \end{bmatrix}$$

oduct is $u \cdot v = u_1 \times v_1 + u_2 \times v_2$
$= 5 \times 8 + 12 \times 6$
$= 112$

Cot

PROGRAM:

```
# DOTPRODUCT OF TWO V

import numpy as np

a1 = 3
b1 = 5
A = np.dot(a1,b1)
print(A)

p = [[2, 1], [0, 3]]
q = [[1, 1], [3, 2]]
print(np.dot(p, q))

a2 = 4 + 5j
b2 = 8 + 6j
print(np.dot(a2, b2))

a3 = [[5, 3], [0, 3]]
b3 = [[1, 7], [3, 6]]
print(np.dot(b, a))
```

OUTPUT:

15

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3.Solving a System Of Linear Equations

A system of linear equations can be represented in matrix form as AX=B, whereA is the matrix of coefficients, X is the column vector of variables, -1 and B is the column vector of solutions. To solve for X, we can use: X=A B assuming A is invertible.

PROGRAM:

```
#SOLVING LINEAR EQUATIONS

import numpy as np

a = np.array([[1,1,1],[0,2,5],[2,5,-1]])
b = np.array([[6],[-4],[27]])
x = np.dot(np.linalg.inv(a),b)
print(x)
```

OUTPUT:

```
[[ 5.]
 [ 3.]
 [-2.]]
```

RESULT:

Thus , the program is executed successfully.