

DEENA

20104016

```
In [ ]: "Github Link
PROBLEM STATEMENT:
1. Create 5 matrices with five different dimensions (1-D,2-D,...5-D)
2. Find determinants of 5 matrices and display your output
3. Find inverse of the above 5 matrices and display your output
4. Find the rank, diagonal and trace of the 5 matrices
5. Find Eigen value and eigen vector for 5 matrices
```

```
In [1]: import numpy as np
import pandas as pd
from numpy import linalg as la
```

1. Create 5 matrices with five different dimensions (1-D,2-D,...5-D)

```
In [16]: A=np.array([[1,2,3,4,5],[4,5,6,2,3],[7,8,5,4,1],[3,5,6,4,2],[2,5,8,9,6]])
B=np.array([[1,2,3,4],[4,5,6,2],[7,8,5,4],[3,5,6,4]])
C=np.array([[1,2,3],[4,5,6],[7,8,5]])
D=np.array([[1,2],[4,5]])
E=np.array([[1]])
print(A)
print(B)
print(C)
print(D)
print(E)
```

```
[[1 2 3 4 5]
 [4 5 6 2 3]
 [7 8 5 4 1]
 [3 5 6 4 2]
 [2 5 8 9 6]]
[[1 2 3 4]
 [4 5 6 2]
 [7 8 5 4]
 [3 5 6 4]]
[[1 2 3]
 [4 5 6]
 [7 8 5]]
[[1 2]
 [4 5]]
[[1]]
```

2. Find determinants of 5 matrices and display your output

```
In [17]: print(la.det(A))
print(la.det(B))
print(la.det(C))
print(la.det(D))
```

```
180.0
-52.000000000000001
12.0
-2.9999999999999996
```

3. Find inverse of the above 5 matrices and display your output

```
In [19]: print(la.inv(A))
print(la.inv(B))
print(la.inv(C))
print(la.inv(D))
```

```
[[-1.28333333  1.16666667  0.38333333 -2.53333333  1.26666667]
 [ 1.66111111 -1.38888889 -0.22777778  2.91111111 -1.62222222]
 [-0.64444444  0.55555556 -0.08888889 -0.64444444  0.48888889]
 [-0.39444444  0.05555556  0.16111111 -0.64444444  0.48888889]
 [ 0.49444444 -0.05555556 -0.06111111  0.24444444 -0.28888889]]
[[ 0.88461538  0.92307692  0.11538462 -1.46153846]
 [-1.11538462 -1.07692308  0.11538462  1.53846154]
 [ 0.19230769  0.46153846 -0.19230769 -0.23076923]
 [ 0.44230769 -0.03846154  0.05769231 -0.23076923]]
[[-1.91666667  1.16666667 -0.25      ]
 [ 1.83333333 -1.33333333  0.5       ]
 [-0.25      0.5       -0.25      ]]
[[-1.66666667  0.66666667]
 [ 1.33333333 -0.33333333]]
```

4. Find the rank, diagonal and trace of the 5 matrices

```
In [23]: print(la.matrix_rank(A))
print(la.matrix_rank(B))
print(la.matrix_rank(C))
print(la.matrix_rank(D))
print(la.matrix_rank(E))
```

```
5
4
3
2
1
```

```
In [28]: print(np.diag(A))
print(np.diag(B))
print(np.diag(C))
print(np.diag(D))
print(np.diag(E))
```

```
[1 5 5 4 6]
[1 5 5 4]
[1 5 5]
[1 5]
[1]
```

```
In [29]: print(np.trace(A))
print(np.trace(B))
print(np.trace(C))
print(np.trace(D))
print(np.trace(E))
```

```
21
15
11
6
1
```

5. Find Eigen value and eigen vector for 5 matrices

```
In [30]: print(la.eigvals(A))
print(la.eigvals(B))
print(la.eigvals(C))
print(la.eigvals(D))
print(la.eigvals(E))
```

```
[21.80728252+0.j          0.66002355+3.79758085j  0.66002355-3.79758085j
 -1.82249345+0.j          -0.30483618+0.j          ]
[17.61111735+0.j          -2.30574191+0.j          -0.15268772+1.12127766j
 -0.15268772-1.12127766j]
[14.0500928  -0.31191836 -2.73817444]
[-0.46410162  6.46410162]
[1.]
```

```
In [35]: x,y=la.eig(A)
print(x)
print(y)
x,y=la.eig(B)
print(x)
print(y)
x,y=la.eig(C)
print(x)
print(y)
x,y=la.eig(D)
print(x)
print(y)
x,y=la.eig(E)
print(x)
print(y)
```

```
[21.80728252+0.j      0.66002355+3.79758085j  0.66002355-3.79758085j
 -1.82249345+0.j      -0.30483618+0.j      ]
[[-0.32629052+0.j      0.33038787-0.45390597j  0.33038787+0.45390597j
  0.18406208+0.j      0.58593489+0.j      ]
 [-0.39582071+0.j      -0.1926559 +0.01715928j -0.1926559 -0.01715928j
 -0.62362314+0.j      -0.74185459+0.j      ]
 [-0.45338779+0.j      -0.41327753+0.07159777j -0.41327753-0.07159777j
  0.70837405+0.j      0.28641062+0.j      ]
 [-0.38816705+0.j      0.03216736+0.28997003j  0.03216736-0.28997003j
 -0.26651525+0.j      0.10685795+0.j      ]
 [-0.6169492 +0.j      0.6215791 +0.j      0.6215791 -0.j
 -0.06626578+0.j      -0.1135007 +0.j      ]]
[17.61111735+0.j      -2.30574191+0.j      -0.15268772+1.12127766j
 -0.15268772-1.12127766j]
[[-0.29892216+0.j      -0.01276216+0.j      0.65069547+0.j
  0.65069547-0.j      ]
 [-0.48081843+0.j      -0.55126347+0.j      -0.62748957-0.02896134j
 -0.62748957+0.02896134j]
 [-0.63690487+0.j      0.7791288 +0.j      0.09121876-0.21069506j
  0.09121876+0.21069506j]
 [-0.52326989+0.j      -0.29816777+0.j      0.05781855+0.35490454j
  0.05781855-0.35490454j]]
[14.0500928 -0.31191836 -2.73817444]
[[-0.26509867 -0.67900284 -0.43246323]
 [-0.61145306  0.71225375 -0.40217306]
 [-0.74555204 -0.17790374  0.8069897  ]]
[-0.46410162  6.46410162]
[[-0.80689822 -0.34372377]
 [ 0.59069049 -0.9390708  ]]
[1.]
[[1.]]
```