ASSIGNMENT - DAY 5

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importing libraries

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

1.Create 5 matrices with 5 different dimension

In [2]:
```
A=np.array([[1]])
B=np.array([[1,2],[3,4]])
C=np.array([[4,7,8],[5,7,8],[5,8,2]])
D=np.array([[1,2,3,8],[9,6,4,3],[1,3,2,7],[7,4,3,0]])
E=np.array([[5,7,6,6,8],[3,6,7,3,2],[2,6,8,1,5],[4,6,5,7,5],[2,4,6,7,0]])
print(A)
print(B)
print(C)
print(D)
print(E)
```

```
[[1]]
[[1 2]
 [3 4]]
[[4 7 8]
 [5 7 8]
 [5 8 2]]
[[1 2 3 8]
 [9 6 4 3]
 [1 3 2 7]
 [7 4 3 0]]
[[5 7 6 6 8]
 [3 6 7 3 2]
 [2 6 8 1 5]
 [4 6 5 7 5]
 [2 4 6 7 0]]
```

2.Determinants of 5 matrices

In [3]:
```
print(la.det(A))
print(la.det(B))
print(la.det(C))
print(la.det(D))
print(la.det(E))
```

```
1.0
-2.0000000000000004
49.99999999999997
-42.00000000000006
-356.9999999999999
```

3.Inverse of the above 5 matrices

In [4]:
```
print(la.inv(A))
print(la.inv(B))
print(la.inv(C))
print(la.inv(D))
print(la.inv(E))
```

```
[[1.]]
[[-2.   1. ]
 [ 1.5 -0.5]]
[[-1.0000000e+00  1.0000000e+00 -4.4408921e-17]
 [ 6.0000000e-01 -6.4000000e-01  1.6000000e-01]
 [ 1.0000000e-01  6.0000000e-02 -1.4000000e-01]]
[[ 0.26190476  1.19047619 -0.80952381 -1.30952381]
 [-0.61904762 -0.9047619   1.0952381   1.0952381 ]
 [ 0.21428571 -1.57142857  0.42857143  1.92857143]
 [ 0.16666667  0.66666667 -0.33333333 -0.83333333]]
[[ 1.15966387  0.52941176 -0.66386555 -1.40336134  0.27731092]
 [-1.20728291  0.1372549   0.28291317  1.59383754 -0.65826331]
 [ 0.54901961 -0.03921569 -0.01960784 -0.84313725  0.39215686]
 [-0.11204482 -0.19607843  0.04481793  0.21288515  0.10364146]
 [ 0.12885154 -0.2745098   0.14845938 -0.04481793  0.03081232]]
```

4.Find rank,diagonal and trace of 5 matrices

4.1 rank

In [5]:
```
print(la.matrix_rank(A))
print(la.matrix_rank(B))
print(la.matrix_rank(C))
print(la.matrix_rank(B))
print(la.matrix_rank(E))
```

```
1
2
3
2
5
```

4.2 diagonal

In [6]:
```
print(np.diag(A))
print(np.diag(B))
print(np.diag(C))
print(np.diag(D))
print(np.diag(E))
```

```
[1]
[1 4]
[4 7 2]
[1 6 2 0]
[5 6 8 7 0]
```

4.3 trace

In [7]:
```
print(np.trace(A))
print(np.trace(B))
print(np.trace(C))
print(np.trace(D))
print(np.trace(E))
```

```
1
5
13
9
26
```

5. Find eigen value and eigen vector for 5 matrices

5.1 eigen values

In [8]:
```
print(la.eigvals(A))
print(la.eigvals(B))
print(la.eigvals(C))
print(la.eigvals(D))
print(la.eigvals(E))
```

```
[1.]
[-0.37228132  5.37228132]
[18.07652875 -0.62077428 -4.45575446]
[15.69039164+0.j         -6.28481907+0.j         -0.20278629+0.62031647j
 -0.20278629-0.62031647j]
[23.43035122+0.j         -4.0411013 +0.j          0.52393287+0.63503996j
  0.52393287-0.63503996j  5.56288432+0.j        ]
```

5.2 eigen vectors

In [9]:
```
print(la.eig(A))
print(la.eig(B))
print(la.eig(C))
print(la.eig(D))
print(la.eig(E))
```

```
(array([1.]), array([[1.]]))
(array([-0.37228132,  5.37228132]), array([[-0.82456484, -0.41597356],
       [ 0.56576746, -0.90937671]]))
(array([18.07652875, -0.62077428, -4.45575446]), array([[-0.59624601, -0.852789
49, -0.46555474],
       [-0.62923055,  0.52096183, -0.36107081],
       [-0.49855753,  0.03672687,  0.80801402]]))
(array([15.69039164+0.j        , -6.28481907+0.j        ,
       -0.20278629+0.62031647j, -0.20278629-0.62031647j]), array([[ 0.41458753+
0.j        ,  0.4858439 +0.j        ,
         0.341382  +0.29334252j,  0.341382  -0.29334252j],
       [ 0.68759771+0.j        , -0.40107668+0.j        ,
        -0.09617521-0.4854111j , -0.09617521+0.4854111j ],
       [ 0.40472404+0.j        ,  0.54990737+0.j        ,
        -0.70424038+0.j        , -0.70424038-0.j        ],
       [ 0.43763571+0.j        , -0.54835671+0.j        ,
         0.2140621 +0.10371984j,  0.2140621 -0.10371984j]]))
(array([23.43035122+0.j        , -4.0411013 +0.j        ,
        0.52393287+0.63503996j,  0.52393287-0.63503996j,
        5.56288432+0.j        ]), array([[ 0.58300666+0.j        ,  0.53855862+
0.j        ,
        -0.35530961+0.44305987j, -0.35530961-0.44305987j,
        -0.54480751+0.j        ],
       [ 0.37683582+0.j        , -0.29590851+0.j        ,
         0.6971874 +0.j        ,  0.6971874 -0.j        ,
         0.22918931+0.j        ],
       [ 0.37092347+0.j        ,  0.33821459+0.j        ,
        -0.33553609-0.02400293j, -0.33553609+0.02400293j,
         0.52420245+0.j        ],
       [ 0.50166001+0.j        ,  0.12989471+0.j        ,
        -0.00909797-0.13481416j, -0.00909797+0.13481416j,
        -0.58075067+0.j        ],
       [ 0.35895823+0.j        , -0.70080741+0.j        ,
        -0.18793481-0.15698737j, -0.18793481+0.15698737j,
        -0.19646243+0.j        ]]))
```