```python
import pandas as pd
import numpy as np

x1 = np.array([[4,2],[2,4],[2,3],[3,6],[4,4]])
x2 = np.array([[9,10],[6,8],[9,5],[8,7],[10,8]])
n1 = len(x1)
n2 = len(x2)
sum=0
sum1=0
for i in range(n1):
  sum+=x1[i][0]
  sum1+=x1[i][1]
sum = sum/n1
sum1 = sum1/n1
u1 = np.array([sum,sum1])
sum=0
sum1=0
for i in range(n2):
  sum+=x2[i][0]
  sum1+=x2[i][1]
sum = sum/n2
sum1 = sum1/n2
u2 = np.array([sum,sum1])
print(u1)
print(u2)
```

```
[3.  3.8]
[8.4 7.6]
```

```python
df1 = pd.DataFrame(x1)
df2 = pd.DataFrame(x2)
```

```python
u11=[]
u22 = []
for column in df1.columns:
  u11.append(np.mean(df1[column]))
for column in df2.columns:
  u22.append(np.mean(df2[column]))
u11 = np.array(u11)
u22 = np.array(u22)
print(u11)
print(u22)
```

```
[3.  3.8]
[8.4 7.6]
```

```python
s1 = x1-u11
s1 = s1.reshape(5,2,1)
s11=0
for x in s1:
  s11+=(np.dot(x,x.T))
s11=s11/(len(s1)-1)
s11
```

```
array([[ 1.  , -0.25],
       [-0.25,  2.2 ]])
```

```python
s2 = x2-u22
s2 = s2.reshape(5,2,1)
s22=0
for x in s2:
  s22+=(np.dot(x,x.T))
s22 = s22/(len(s2)-1)
s22
```

```
array([[ 2.3 , -0.05],
       [-0.05,  3.3 ]])
```

```python
sw = s11 + s22
sw
```

```
array([[ 3.3, -0.3],
       [-0.3,  5.5]])
```

```python
swi = np.linalg.inv(sw)
swi
```

```
array([[0.30454042, 0.0166113 ],
       [0.0166113 , 0.18272425]])
```

```python
u111 = u11.reshape(2,1)
u222 = u22.reshape(2,1)
sb = np.dot(u111-u222,(u111-u222).T)
sb
```

```
array([[29.16, 20.52],
       [20.52, 14.44]])
```

```python
swr = np.dot(swi,sb)
swr
```

```
array([[9.22126246, 6.48903654],
       [4.23388704, 2.97940199]])
```

```python
eigenvalues,eigenvector = np.linalg.eig(swr)
idx = eigenvalues.argsort()[::-1]
eigenvalues = eigenvalues[idx]
eigenvector = eigenvector[:,idx]
print(eigenvalues)
eigenvector
```

```
[12.20066445  0.        ]
array([[ 0.90878558, -0.57549341],
       [ 0.41726342,  0.81780642]])
```

```python
tr = (eigenvector.T)[0]
tr
```

```
array([0.90878558, 0.41726342])
```

```python
for x in x1:
  x = x.reshape(2,1)
  x = np.dot(tr,x)
  print(x)
```

```
[4.46966918]
[3.48662485]
[3.06936143]
[5.22993727]
[5.30419602]
```

```python
for x in x2:
  x = x.reshape(2,1)
  x = np.dot(tr,x)
  print(x)
```

```
[12.35170446]
[8.79082087]
[10.26538736]
[10.19112861]
[12.4259632]
```

Start coding or generate with AI.