HW6_Problem2_PCAManual

May 21, 2021

[15]:
```
import numpy as np

# define dataset matrix
A = np.array([[1, 1], [4, 4], [5, 5]])
print('dataset matrix:\n', A)

# calculate the mean of each column
M = np.mean(A.T, axis=1)
print('mean:\n', np.round(M,2))

# center columns by subtracting column means
C = A-M
print('center:\n',np.round(C,2))

# calculate covariance matrix of centered matrix
V = np.cov(C.T)
print('convariance:\n', np.round(V, 2))

# eigen of covariance matrix
values, vectors = np.linalg.eig(V)
print('vectors:\n', np.round(vectors,2))
print('values:\n', np.round(values,2))

# project data
P = vectors.T.dot(C.T)
print('project data:\n',np.round(P.T,2))
```

```
dataset matrix:
 [[1 1]
 [4 4]
 [5 5]]
mean:
 [3.33 3.33]
center:
 [[-2.33 -2.33]
 [ 0.67  0.67]
 [ 1.67  1.67]]
convariance:
```

```
 [[4.33 4.33]
 [4.33 4.33]]
vectors:
 [[ 0.71 -0.71]
 [ 0.71  0.71]]
values:
 [8.67 0.  ]
project data:
 [[-3.3  -0.  ]
 [ 0.94  0.  ]
 [ 2.36  0.  ]]
```

[ ]: