C2_python

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2021-01-06

차 례

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```
import numpy as np
P=np.array([[0.7, 0.3],[0.5, 0.5]])
print(P)
```

```
## [[0.7 0.3]
##  [0.5 0.5]]
```

```
egien_value, egien_vector = np.linalg.eig(P.T) # eigen-decomposition for P^t
print(egien_value)
```

```
## [1.  0.2]
```

```
print(egien_vector)
```

```
## [[ 0.85749293 -0.70710678]
##  [ 0.51449576  0.70710678]]
```

```
x_1=egien_vector[:,0]
print(x_1)
```

```
## [0.85749293 0.51449576]
```

```
## [0.625 0.375]
```

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```
import numpy as np
P=np.array([[0.7, 0.3],[0.5, 0.5]])
n=len(P) # n=|S|
I=np.identity(n) # identity matrix
A=np.c_[P-I,np.repeat(1,n)]
b=np.append(np.repeat(0,n), np.array(1))
print(A)
```

```
## [[-0.3  0.3  1. ]
##  [ 0.5 -0.5  1. ]]
```

```
print(b)
```

```
## [0 0 1]
```

```
v=np.linalg.solve(np.dot(A,A.T),np.dot(A,b.T))
print(v)
```

```
## [0.625 0.375]
```

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```
from numpy.linalg import matrix_power # provides matrix pwoer
P=np.array([[0.7, 0.3],[0.5, 0.5]])
print(P)
```

```
## [[0.7 0.3]
##  [0.5 0.5]]
```

```
print(np.dot(P,P)) # matrix multiplication
```

```
## [[0.64 0.36]
##  [0.6  0.4 ]]
```

```
print(matrix_power(P,3))
```

```
## [[0.628 0.372]
##  [0.62  0.38 ]]
```

```
print(matrix_power(P,4))
```

```
## [[0.6256 0.3744]
##  [0.624  0.376 ]]
```

```
print(matrix_power(P,20))
```

```
## [[0.625 0.375]
##  [0.625 0.375]]
```

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```
from numpy.linalg import matrix_power
P=np.array([[0,1],[1,0]])
print(P)
```

```
## [[0 1]
##  [1 0]]
```

```
print(matrix_power(P,2))
```

```
## [[1 0]
##  [0 1]]
```

```
print(matrix_power(P,3))
```

```
## [[0 1]
##  [1 0]]
```