In [1]:

```
import numpy as np
```

In [10]:

```
A = np.zeros((4,4))
```

In [11]:

```
A
```

Out[11]:

```
array([[ 0.,  0.,  0.,  0.],
       [ 0.,  0.,  0.,  0.],
       [ 0.,  0.,  0.,  0.],
       [ 0.,  0.,  0.,  0.]])
```

In [12]:

```
A[0,2]=1.0
A[0,3]=0.5
A[1,0]=1.0/3.0
A[2,0]=1.0/3.0
A[2,1]=0.5
A[2,3]=0.5
A[3,0]=1.0/3.0
A[3,1]=0.5
```

In [13]:

```
print(A)
```

```
[[ 0.          0.          1.          0.5       ]
 [ 0.33333333  0.          0.          0.        ]
 [ 0.33333333  0.5         0.          0.5       ]
 [ 0.33333333  0.5         0.          0.        ]]
```

In [20]:

```
V, W = np.linalg.eig(A)
print(V[0])
print(W[:,0])
```

```
(1+0j)
[ 0.72101012+0.j  0.24033671+0.j  0.54075759+0.j  0.36050506+0.j]
```

In [28]:

```
B = 0.85 * A + 0.15 * (1.0/4.0) * np.ones((4,4))
```

In [29]:

```
print(B)
```

```
[[ 0.0375      0.0375      0.8875      0.4625    ]
 [ 0.32083333  0.0375      0.0375      0.0375    ]
 [ 0.32083333  0.4625      0.0375      0.4625    ]
 [ 0.32083333  0.4625      0.0375      0.0375    ]]
```

In [31]:

```
V, W = np.linalg.eig(B)
print(V[0])
print(W[:,0])
```

```
(1+0j)
[ 0.69648307+0.j  0.26828096+0.j  0.54477802+0.j  0.38230037+0.j]
```

In [ ]:

```

```