

```
> with(LinearAlgebra):
```

```
> A0:=Matrix([[0,1,1,1,1,0,1],  
[1,0,0,0,0,0,0],  
[1,1,0,0,0,0,0],  
[0,1,1,0,1,0,0],  
[1,0,1,1,0,1,0],  
[1,0,0,0,1,0,0],  
[0,0,0,0,1,0,0]]);
```

$$A0 := \begin{bmatrix} 0 & 1 & 1 & 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \end{bmatrix}$$

```
> A1:=Transpose(A0);
```

$$A1 := \begin{bmatrix} 0 & 1 & 1 & 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

```
> A2:=Matrix(7,7,0);
```

```
for j from 1 to 7 do  
  sum1:=0;  
  for i from 1 to 7 do  
    sum1:=sum1+A1[i,j];  
  end do;  
  for i from 1 to 7 do  
    A2[i,j]:=A1[i,j]/sum1;  
  end do;  
end do;
```

$$A2 := \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

sum1 := 0

sum1 := 0

sum1 := 0

sum1 := 0

sum1 := 0

sum1 := 0

sum1 := 0

```
> A2;
```

$$A2 := \begin{bmatrix} 0 & 1 & \frac{1}{2} & 0 & \frac{1}{4} & \frac{1}{2} & 0 \\ \frac{1}{5} & 0 & \frac{1}{2} & \frac{1}{3} & 0 & 0 & 0 \\ \frac{1}{5} & 0 & 0 & \frac{1}{3} & \frac{1}{4} & 0 & 0 \\ \frac{1}{5} & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 \\ \frac{1}{5} & 0 & 0 & \frac{1}{3} & 0 & \frac{1}{2} & 1 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 \\ \frac{1}{5} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

```
> x:=Vector([1,0,0,0,0,0,0]);
```

$$x := \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

```
> x2:=A2.A2.A2.A2.A2.x;
```

$$x2 := \begin{bmatrix} \frac{2311}{7200} \\ \frac{11189}{72000} \\ \frac{2521}{18000} \\ \frac{3947}{36000} \\ \frac{3943}{24000} \\ \frac{191}{3600} \\ \frac{679}{12000} \end{bmatrix}$$

```
> evalf(x2);
```

$$\begin{bmatrix} 0.3209722222 \\ 0.1554027778 \\ 0.1400555556 \\ 0.1096388889 \\ 0.1642916667 \\ 0.0530555556 \\ 0.05658333333 \end{bmatrix}$$

```
> with(LinearAlgebra):
```

```
> Column(Eigenvectors(evalf(Matrix([[1,2],[2,3]])))[2],1);
```

$$\begin{bmatrix} -0.850650808352039878 + 0. I \\ 0.525731112119133480 + 0. I \end{bmatrix}$$

```
> Column(Eigenvectors(evalf(A2))[2],1);
```

$$\begin{bmatrix} -0.699456533839517112 + 0. I \\ -0.382860418517281864 + 0. I \\ -0.323958815668839662 + 0. I \\ -0.242969111757063455 + 0. I \\ -0.412311219946393359 + 0. I \\ -0.103077804987685151 + 0. I \\ -0.139891306769378442 + 0. I \end{bmatrix}$$

```
> total:=0;
for i from 1 to 7 do
total:=total+x2[i]*x2[i];
end do;
```

total := 0

```
> VectorScalarMultiply(x2,evalf(1/sqrt(total)));
```

$$\begin{bmatrix} 0.699448608620870880 \\ 0.382862611459104384 \\ 0.323972775630366638 \\ 0.242989982592999254 \\ 0.412292678103659438 \\ 0.103082281859917468 \\ 0.139907700733081814 \end{bmatrix}$$

```
>
```