In [1]:

```
P=matrix([[0.8,0,0],[0.1,0.9,0],[0.1,0.1,1]])
show(P)
```

Out[1]:

$$\begin{pmatrix} 0.800000000000000 & 0.000000000000000 & 0.000000000000000 \\ 0.100000000000000 & 0.900000000000000 & 0.000000000000000 \\ 0.100000000000000 & 0.100000000000000 & 1.00000000000000 \end{pmatrix}$$

In [2]:

```
v=vector([1,0,0]).column()
once=P*v
show(once)
```

Out[2]:

$$\begin{pmatrix} 0.800000000000000 \\ 0.100000000000000 \\ 0.100000000000000 \end{pmatrix}$$

In [3]:

```
show(P^2*v)
```

Out[3]:

$$\begin{pmatrix} 0.640000000000000 \\ 0.170000000000000 \\ 0.190000000000000 \end{pmatrix}$$

In [4]:

```
show(P^3*v)
```

Out[4]:

$$\begin{pmatrix} 0.512000000000000 \\ 0.217000000000000 \\ 0.271000000000000 \end{pmatrix}$$

In [5]:

```
show(P^(30)*v)
```

Out[5]:

$$\begin{pmatrix} 0.00123794003928538 \\ 0.0411532182359309 \\ 0.957608841724784 \end{pmatrix}$$

In [6]:

```
P=matrix([[4/5,0,0],[1/10,9/10,0],[1/10,1/10,1]])
show(P)
```

Out[6]:

$$\begin{pmatrix} \frac{4}{5} & 0 & 0 \\ \frac{1}{10} & \frac{9}{10} & 0 \\ \frac{1}{10} & \frac{1}{10} & 1 \end{pmatrix}$$

In [7]:

```
show(P.eigenvectors_right())
```

Out[7]:

$$\left[(1, [(0,\ 0,\ 1)], 1), \left(\frac{9}{10}, [(0,\ 1,\ -1)], 1\right), \left(\frac{4}{5}, [(1,\ -1,\ 0)], 1\right)\right]$$

In [0]:

```

```