Conditions

You are given a transition matrix P. Find the steady-state distribution vector
P =
0.3 0 0.7
1 0 0
0 0.4 0.6
hello, i don't understand how to the stedy-state vector system works. i have already tried multiplying
P by[0.3 0 0.7] that did not work, i also tried multiplying it by [x y z] but it didn't seem to work.
extra info:
the example that i was looking at in the book did this
[x y] [.8 .2]
.1 .9
so i assumed that i could do the same with x y z

Solution

The steady state vector x satisfies the equation Px = x .

That is, it is an eigenvector for the eigenvalue 1.

We must multiply the matrix P-I on (x,y,z)

$$\begin{pmatrix} -0.7 & 0 & 0.7 \\ 1 & -1 & 0 \\ 0 & 0.4 & -0.4 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = 0$$

$$\begin{cases} -0.7x + 0.7z = 0 \\ x - y = 0 \\ 0.4y - 0.4z = 0 \end{cases}$$

$$x = y$$

$$y = z$$

$$z = x$$

$$Let\ x = \frac{1}{\sqrt{3}}$$

The steady state vector $(x, y, z) = (\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}})$