



The percentage of people using Apple OS X or the Gnu/Linux operating system is represented by a vector $\vec{v} = \begin{bmatrix} m \\ l \end{bmatrix}$. Let $2/3$ be the percentage of Mac OS X users, who switch to Linux each month and $1/2$ the percentage of Linux OS users, who switch to Apple each month. What is the distribution Linux/OSX users after 2 years if initially both groups have the same number of users.

The matrix $A = \begin{bmatrix} 1/3 & 1/2 \\ 2/3 & 1/2 \end{bmatrix}$, has the property that $A \begin{bmatrix} m \\ l \end{bmatrix}$ is the distribution a month later. It is called a **stochastic matrix**: the sum in each column is 1. The dynamics $x(t) \mapsto Ax(t) = x(t+1)$ is called a **Markov chain**.

AIM: COMPUTE $A^k \begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix}$, the distribution after k months for $k = 1$ and if you want for $k = 2$.

COMPUTE THE EIGENVALUES OF A.

COMPUTE THE EIGENVECTORS OF A.

WHAT IS THE MATRIX S for which $S^{-1}AS = B$ is diagonal.

WHAT IS B^{24} , up to 10 digits accuracy?

WHAT IS A^{24} ?

WHAT IS THE DISTRIBUTION AFTER 24 YEARS?