Mateus Cagabuna

$N \to S: 5$ $N \to L: 4$ $S \to L: 2$ $L \to S: 1$ $L \to O: 3$

~~$N \to O: 7$~~ $O \to N: 1$ $O \to S: 2$ $O \to L: 2$

$$Q = \begin{bmatrix} -9 & 5 & 4 & 0 \\ 0 & -2 & 2 & 0 \\ 0 & 1 & -4 & 3 \\ 1 & 2 & 2 & -5 \end{bmatrix}$$

$$\begin{cases} -9\pi_N + \pi_O = 0 \\ 5\pi_N - 2\pi_S + \pi_L + 2\pi_O = 0 \\ 4\pi_N + 2\pi_S - 4\pi_L + 2\pi_O = 0 \\ 3\pi_L - 5\pi_O = 0 \\ \pi_N + \pi_S + \pi_L + \pi_O = 1 \end{cases}$$

$-9\pi_N + \pi_O = 0 \Rightarrow \pi_O = 9\pi_N$

$5\pi_N - 2\pi_S + \pi_L + 2\pi_O = 0$

$4\pi_N + 2\pi_S - 4\pi_L + 2\pi_O = 0$

$3\pi_L - 5\pi_O = 0 \Rightarrow \pi_L = \frac{5}{3}\pi_O$

$\pi_N + \pi_S + \pi_L + \pi_O = 1$

$\pi_O = 9\pi_N$

$\pi_L = \frac{5}{3} \cdot 9\pi_N = 15\pi_N$

$5\pi_N - 2\pi_S + 15\pi_N + 2 \cdot 9\pi_N = 0 \Rightarrow 5\pi_N + 15\pi_N + 18\pi_N - 2\pi_S = 0 \Rightarrow$

$38\pi_N - 2\pi_S = 0$ $F\ \pi_S = 19\pi_N$

$\pi_N = \pi_N$

$\pi_S = 19\pi_N$

$\pi_L = 15\pi_N$

$\pi_O = 9\pi_N$

$\pi_N + 19\pi_N + 15\pi_N + 9\pi_N = 1$

$\pi_N = 1/44$

$\pi_N = \frac{1}{44}$

$\pi_S = 19 \cdot \frac{1}{44} = \frac{19}{44}$

$\pi_L = 15/44$

$\pi_O = 9/44$

Estado	Prob. exata	Aprox.
N	1/44	2,27%
S	19/44	43,18%
L	15/44	34,09%
O	9/44	20,45%