

Procesos de Markov - Inciso d) preguntas 2 y 3 (Teórico)

$$2. [x \ y \ z] \begin{bmatrix} 0.1 & 0.9 & 0 \\ 0 & 0.05 & 0.95 \\ 0 & 0 & 1 \end{bmatrix} = [x \ y \ z]$$

Además, $x+y+z=1$. Tenemos el sistema:

$$\begin{cases} 0.1x = x \longrightarrow \boxed{x=0} \\ 0.9x + 0.05y = y \\ 0.95y + z = z \\ x+y+z=1 \end{cases} \longrightarrow 0.95y = 0 \longrightarrow \boxed{y=0}$$

$$\downarrow \\ 0+0+z=1 \longrightarrow \boxed{z=1}$$

Entonces, el estado estable es: $[0 \ 0 \ 1]$

$$3. [x \ y \ z] \begin{bmatrix} 0.1 & 0.9 & 0 \\ 0 & 0.05 & 0.95 \\ 0.02 & 0 & 0.98 \end{bmatrix} = [x \ y \ z]$$

Además, $x+y+z=1$:

$$\begin{cases} 0.1x + 0.02z = x \longrightarrow 0.9x = 0.02z \\ 0.9x + 0.05y = y \longrightarrow 0.9x = 0.95y \\ 0.95y + 0.98z = z \longrightarrow 0.95y = 0.02z \\ x+y+z=1 \longrightarrow z=1-x-y \longrightarrow 0.95y = 0.02(1-x-y) \end{cases}$$

$$0.95y = 0.02 - 0.02x - 0.02y$$

$$\longrightarrow 0.9x = 0.02 - 0.02x - 0.02\left(\frac{0.9x}{0.95}\right)$$

$$\longrightarrow 0.9x + 0.02x + 0.038947x = 0.02$$

$$\longrightarrow 0.958947x = 0.02 \longrightarrow \boxed{x = 0.0209}$$

$$y = \frac{0.9}{0.95} (0.0209) = \boxed{0.0198=y}$$

$$z = 1 - 0.0209 - 0.0198 = \boxed{0.9593}$$

Entonces, el estado estable es: $[0.0209 \ 0.0198 \ 0.9593]$