

a) Calcule un vector fijo de probabilidades para la matriz  $\begin{pmatrix} 9 & & \\ 9 & 3 & \\ 4 & 1 & \end{pmatrix} c [s]$

$$T = \begin{pmatrix} 2/3 & 1/6 & 1/6 \\ 1/4 & 1/2 & 1/4 \\ 0 & 0 & 1 \end{pmatrix}$$

$$t(x, y, z) = tT = (x, y, z) \begin{pmatrix} 2/3 & 1/6 & 1/6 \\ 1/4 & 1/2 & 1/4 \\ 0 & 0 & 1 \end{pmatrix}$$

$$(x, y, z) = \left( \frac{2}{3}x + \frac{1}{4}y \quad \frac{1}{6}x + \frac{1}{2}y \quad \frac{1}{6}x + \frac{1}{4}y + z \right)$$

$$\frac{2}{3}x + \frac{1}{4}y = x$$

$$\frac{1}{6}x + \frac{1}{2}y = y$$

$$\frac{1}{6}x + \frac{1}{4}y + z = z$$

$$x + y + z = 1$$

$$-\frac{1}{3}x + \frac{1}{4}y = 0$$

$$\frac{1}{6}x - \frac{1}{2}y = 0$$

$$\frac{1}{6}x + \frac{1}{4}y = 0$$

$$x=0, y=0, z=1$$

$$t = (0, 0, 1)$$

$$\left( \begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ -\frac{1}{3} & \frac{1}{4} & 0 & 0 \\ \frac{1}{6} & -\frac{1}{2} & 0 & 0 \\ \frac{1}{6} & \frac{1}{4} & 0 & 0 \end{array} \right) \xrightarrow{\substack{F_2 - F_1(-1/3) \rightarrow F_2 \\ F_3 - F_1(1/6) \rightarrow F_3 \\ F_4 - F_1(1/6) \rightarrow F_4}} \left( \begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ 0 & 7/12 & 1/3 & 1/3 \\ 0 & -2/3 & -1/6 & -1/6 \\ 0 & 1/12 & -1/6 & -1/6 \end{array} \right)$$

$$F_4 \left( \frac{3}{4} \right) - F_3 \left( \frac{3}{14} \right) \rightarrow F_4$$

$$F_3 \left( \frac{1}{14} \right) \rightarrow F_3$$

$$F_2 \left( \frac{7}{12} \right) \rightarrow F_2$$

$$F_3 - F_2 \left( -\frac{2}{3} \right) \rightarrow F_3$$

$$F_4 - F_2 \left( \frac{1}{12} \right) \rightarrow F_4$$

$$\left( \begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ 0 & 1 & 4/7 & 4/7 \\ 0 & 0 & 3/14 & 3/14 \\ 0 & 0 & -13/14 & -13/14 \end{array} \right) \xrightarrow{\substack{F_2 \left( \frac{4}{7} \right) \rightarrow F_2 \\ F_3 - F_2 \left( \frac{4}{7} \right) \rightarrow F_3 \\ F_4 - F_2 \left( \frac{1}{12} \right) \rightarrow F_4}} \left( \begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{array} \right)$$

$$F_1 - F_3(1) \rightarrow F_1$$