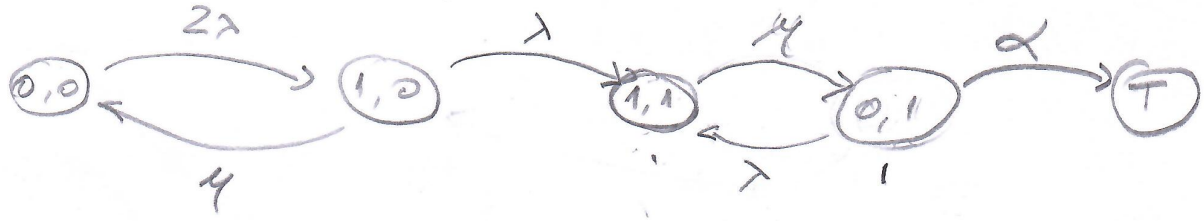
HOMEWORK 17 : JUAN PABLO ROYO SALES

17.1.A



Q=

	00	10	11	0,1	T
00	-1/2	1/2	0	0	0
10	1	-5/4	1/4	0	0
11	0	0	-1	1	0
01	0	0	1/4	-1	3/4
T	0	0	0	0	0

	00	10	11	01	T
00	0	1	0	0	0
10	4/5	0	1/5	0	0
11	0	0	0	1	0
01	0	0	1/4	0	3/4
T	0	0	0	0	0

(P)

$m_{0001} = 2 + 1\, m_{1001}$

$m_{1001} = \frac{4}{5} + \frac{4}{5} m_{0001} + \frac{1}{5} m$

$m_{(11)(T)} = 2 + m_{(01)T} \Rightarrow m_{(11)T} = 2 + 1 + \frac{1}{4} m_{(11)T}$

$m_{(01)T} = 1 + \frac{1}{4} m_{(11)T}$

$m_{(11)T} = \frac{3}{1-\frac{1}{4}} = 4$

17.1.B

$$-T^{-1} = \begin{vmatrix} 1/2 & -1/2 & 0 & 0 \\ -1 & 5/4 & -1/4 & 0 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & -1/4 & 1 \end{vmatrix}^{-1} = \frac{1}{\det(T)} C^T$$

$$\begin{matrix} + & - & + & - \\ - & + & - & + \\ + & - & + & - \\ - & + & - & + \end{matrix}$$

$$= \frac{32}{3} C^T$$

$$\frac{32}{} = \frac{32}{3} \begin{vmatrix} 1/2 & 1/2 & 0 & 0 \\ 1 & 5/4 & 1/4 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 1/4 & 1 \end{vmatrix}^T$$

$$-T^{-1} = \frac{32}{3} \begin{vmatrix} 1/2 & 1 & 0 & 0 \\ 1/2 & 5/4 & 0 & 0 \\ 0 & 1/4 & 1 & 1/4 \\ 0 & 0 & 1 & 1 \end{vmatrix} = \begin{vmatrix} 10/3 & 4/3 & 4/3 & 4/3 \\ 8/3 & 4 & 4/3 & 4/3 \\ 0 & 0 & 4/3 & 4/3 \\ 0 & 0 & 4/3 & 4/3 \end{vmatrix}$$

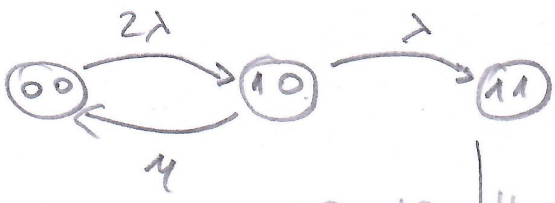
17.1.C

$$\begin{vmatrix} 10 & 4 & 4/3 & 4/3 \\ 8 & 4 & 4/3 & 4/3 \\ 0 & 0 & 4/3 & 4/3 \\ 0 & 0 & 4/3 & 4/3 \end{vmatrix} \begin{vmatrix} 1 \\ 1 \\ 1 \\ 1 \end{vmatrix} = \begin{matrix} 00 & 10 & 11 & 01 \\ [18 & 8 & \frac{13}{3} & \frac{16}{3}] \end{matrix}$$

17.1.D

$$E[Y] = \frac{13}{3}$$

17.2



$$Q = \begin{array}{c|ccc} & 00 & 10 & 11 \\ \hline 00 & -1 & 1 & 0 \\ 10 & 1 & -3/2 & 1/2 \\ \hline 11 & 0 & 0 & 0 \end{array}$$

$$N = -T^{-1} = \begin{vmatrix} 1 & -1 \\ -1 & 3/2 \end{vmatrix}^{-1} = \frac{1}{\det(T)} C^T$$

$$= 2 \begin{vmatrix} 1 & 1 \\ 1 & 3/2 \end{vmatrix} = \begin{vmatrix} 2 & 2 \\ 2 & 3 \end{vmatrix}$$

17.2.A

$$\begin{vmatrix} 2 & 2 \\ 2 & 3 \end{vmatrix} \begin{vmatrix} 1 \\ 1 \end{vmatrix} = \begin{bmatrix} 00 & 10 \\ 4 & 5 \end{bmatrix}$$